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This study was conducted to provide baseline environmental data on the abundance and distribution of fish eggs and larvae in the St. Clair-Detroit River System (SCDRS) and to assess potential impacts on fish reproduction that might occur if winter ship passages in the SCDRS increase as a result of lock operations and winter navigation to 31 January ± 2 weeks..

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Environmental Study of Fish Spawning and Nursery Areas in the St. Clair-Detroit River System

by

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EXECUTIVE SUMMARY

The U. S. Army Corps of Engineers, Detroit District, is preparing a supplemental Environmental Impact Statement for extension of operations and maintenance of lock facilities at Sault Ste. Marie, Michigan to 31 January ± 2 weeks. This environmental study of fish spawning and nursery areas in the St. Clair-Detroit River System (SCDRS) was conducted to provide baseline data on the abundance and distribution of fish eggs and larvae in this system and to assess potential impacts on fish reproduction that might occur if winter ship passages in SCDRS increase as a result of the extension of lock operations. Fish eggs were collected with an egg pump and larvae with a townet at selected locations throughout SCDRS during 1983 and 1984. Analyses of the distribution and abundance of eggs of 19 species of fish and larvae of 29 species that were collected suggested abundance differed significantly between rivers and between years. The number of eggs collected in the Detroit River was more than 2.5 times greater than the number collected in the St. Clair River during the 2-year period. Eggs of rainbow smelt (Osmorus mordax) constituted most of the St. Clair River samples and those of gizzard shad (Dorosoma cepedianum) and white bass (Morone chrysops) dominated the Detroit River samples. In both rivers, egg abundance was less in 1983 than in 1984. Fish larvae were also less abundant in 1983 than in 1984, but the major difference occurred in the St. Clair River. Alewives (Alosa pseudoharengus) were the most abundant larvae in both rivers during both years. Rainbow smelt, various darters, and logperch (Percina caprodes) were also abundant in the St. Clair River, and gizzard shad and emerald shiners (Notropis atherinoides) in the Detroit River. Because larvae of walleye (Stizostedion vitreum vitreum) and yellow perch (Perca falvescens) larvae were collected from the St. Clair and Detroit rivers, we concluded that neither species used the two rivers extensively as spawning or nursery areas in 1983-1984.

The distribution of larvae, as indicated by densities of all taxa combined, was significantly different among transects, among locations, and among months for each river and each year of the study. In 1983 in the St. Clair River, the density of larvae was lower at transect I than at other transects; densities were lower at nearshore sampling locations than at mid-channel locations and were lower in May and June than in July and August. In 1984, there were no differences in densities among transects; densities remained lower at nearshore locations than at mid-channel locations; and monthly densities were highest in June and July, and lowest in May and August. In the Detroit River, density differences among transects were significant in 1983, but not in 1984. Densities of larvae were highest in May and June in 1983 and in June and July in 1984.

Water temperatures and ice conditions both affect the abundance of eggs and larvae. Lower water temperatures and a slower rate of warming in 1983 probably contributed to the lower abundance of eggs and larvae in that year. In 1984 an ice jam in the St. Clair River in April probably delayed fish spawning throughout SCDRS, but rapid warming occurred in May and June and larger numbers of eggs and larvae were produced in 1984 than in 1983. Use of SCDRS by a variety of fish species in spring and summer for spawning and as a

nursery area is documented by this study, but the extent of use differed between years. The impacts on fish spawning success that might be caused by an extension of lock operations and the resulting increase in vessel traffic in SCDRS will probably depend on the degree of change such activity might have on ice accumulation and movements, altered water temperatures, and physical modification of spawning habitat.

INTRODUCTION

The St. Clair-Detroit River System (SCDRS), which consists of the St. Clair River, Lake St. Clair, and the Detroit River (Fig. 1), is the interconnecting waterway between the upper Great Lakes (Huron, Michigan, and Superior) and the lower Great Lakes (Erie and Ontario). Millions of tons of commercial shipping transit the SCDRS annually during the navigation season. Shipping access to and from Lake Superior by way of the federal locks operated by the U. S. Army Corps of Engineers (COE) at Sault Ste. Marie, Michigan, is curtailed for the rest of the winter when adverse icing conditions persist in the harbors and the locks are closed. This closure directly affects shipping in SCDRS, although vessel traffic not dependent on the locks continues in SCDRS throughout the winter.

In addition to serving as a major commercial shipping route, SCDRS supports a valuable sport fishery that is very close to the large Detroit-Windsor metropolitan area. The SCDRS is also a spawning and nursery ground for fish populations in Lakes Huron and Erie (Nepszy 1977; Johnson 1977; Goodyear et al. 1982; Hatcher and Nester 1983) and is a migration route between Lakes Huron, St. Clair, and Erie for species such as walleye, white bass, rock bass, yellow perch, and white perch. The importance of SCDRS to fish migration was demonstrated by the capture of walleyes in Lake Huron that had previously been tagged more than 100 miles away along the south shore of western Lake Erie (Wolfert 1963). A study conducted by the Michigan Department of Natural Resources in 1983 and 1984 showed that rock bass, followed by yellow perch and walleyes, were the most abundant fish collected in trap net catches in the St. Clair River and that rock bass, followed by yellow perch, white perch, and walleye were the most abundant species in the Detroit River (Haas et al. 1984). A survey of sport fishing activities throughout the Michigan waters of SCDRS (Haas et al. 1984) indicated that nearly 1.8 million hours of sport fishing occurred from October 1983 to September 1984 and that fish pressure was considerably heavier in the Detroit River (more than 1.2 million hours) than in the St. Clair River (slightly over 0.5 million hours).

Although shipping and sport fishing are not the only uses of SCDRS, they are significantly important socio-economical factors affecting regional interests and the Great Lakes basin as a whole. In recent years, an extension of the winter navigation season has been proposed as a way to provide economic benefits to the shipping industry. However, because such a change in shipping activities might affect the SCDRS fishery, an Environmental Impact Statement (EIS) is required before changes in the navigation season can be approved. The Detroit District COE prepared an EIS in October 1979 entitled, "Supplement to the operation and maintenance Environmental Impact Statement for the Federal facilities at Sault Ste. Marie, Michigan, addressing limited season extension of operation." This statement considered an extension of the lock operation (i.e. winter navigation) to January 8 ± 1 week as being the most feasible plan. The COE then later considered an alternative plan to extend Sault Ste. Marie lock operations to January 31 ± 2 weeks. A supplemental EIS is required to describe potential environmental impacts, including those on

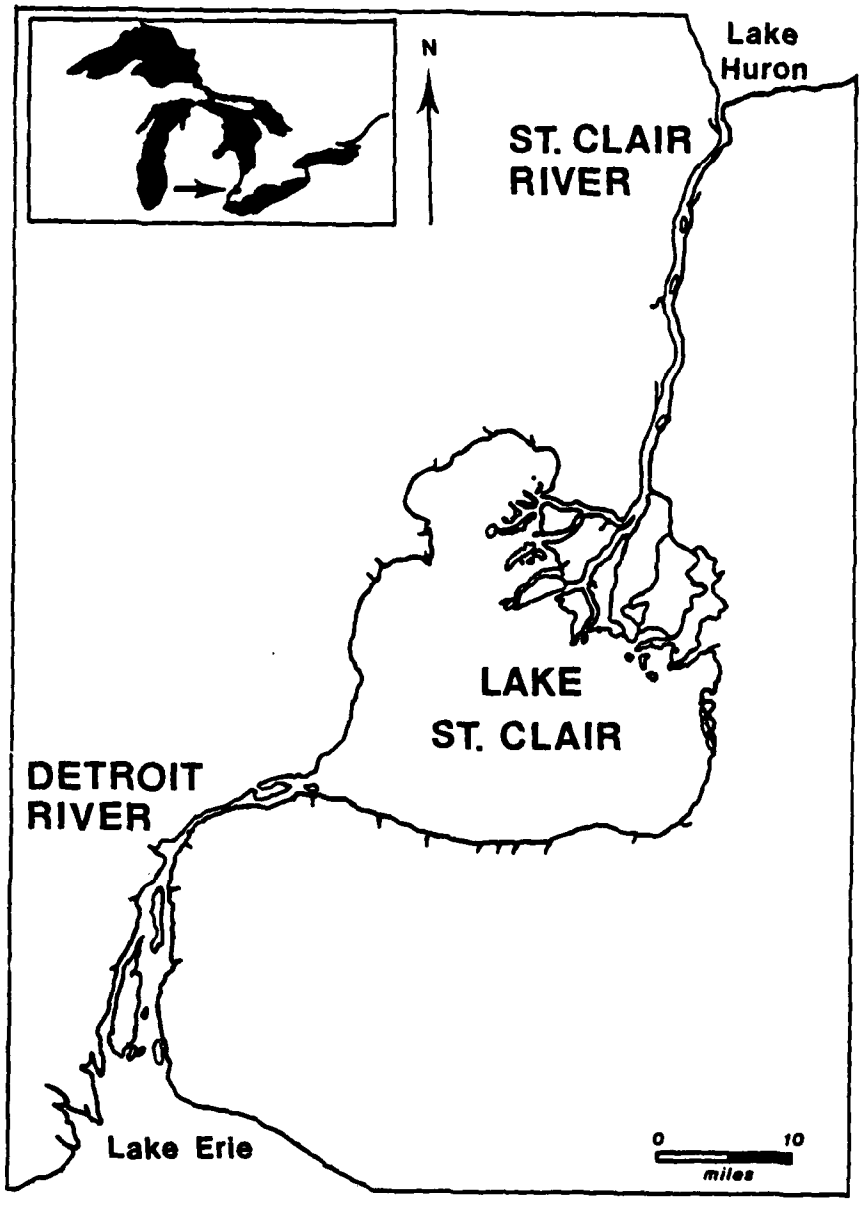

Fig. 1 The St. Clair-Detroit River System.

the fish spawning and nursery areas of SCDRS, that might be associated with the alternative extended winter navigation season. Because available fishery data for SCDRS were limited, COE contracted with the Great Lakes Fishery Laboratory and Michigan Department of Natural Resources to acquire the fishery information needed for the preparation of this Supplemental EIS.

The objectives of the present study were to (1) locate and describe the fish spawning and nursery areas throughout SCDRS during 1983 and 1984, and (2) assess the potential impacts on these areas that might occur as the result of extending the navigation seasons to January 31 ± 2 weeks.

DESCRIPTION OF THE STUDY AREA

The surface bedrock geology in the study area dates back to the Devonian period, is of marine origin, and consists mainly of shales in the St. Clair River and dolomites in the Detroit River. Glaciation has modified the topography by scouring and filling. The SCDRS lies in a morainal trough and is characterized by sediments consisting of glacial till and lake and stream deposits. The rivers are incised into a bed of glacial, lake-deposited clays with thicknesses of 80-200 ft in the St. Clair River (Cole 1903) and 20-140 ft in the Detroit River (Mozola 1969).

The SCDRS is 89 mi (143.2 km) long, drops 8 ft (2.4 m) between Lake Huron and Lake Erie and can be divided into five major segments: the upper St. Clair River, the lower St. Clair River delta, Lake St. Clair, and the upper and lower segments of the Detroit River (Figs. 1 and 2). Most of the following hydrographic information on the system comes from Derecki (1984 a, b, c). The upper St. Clair River is 27.9 mi (45 km) long and receives water from Lake Huron and three major tributaries (the Black, Pine, and Belle rivers). The lower St. Clair River, which begins at the branching of the north and south channels near Algonac, Michigan, is 11.2 mi (18 km) long and divides to form a large delta area consisting of three main channels (north, middle, and south) and a number of secondary channels that empty into Lake St. Clair.

Width of the St. Clair River ranges from 820 to 3,940 ft (250-1200 m) and averages 2,625 ft (800 m) in the upper section. The widths of the three main channels in the delta area range from 700 to 3,000 ft (214-915 m). Mid-channel depths range from 27 to 70 ft (8.2 - 21.5 m) and a minimum statutory depth of 27 ft is maintained by dredging. Littoral depths are typically 6-13 ft (1.8-4.0 m). All but 3.2 mi of the shoreline, excluding the islands, is bulkheaded. The mean annual discharge rate of the St. Clair River into Lake St. Clair was 214,000 ft^3/s (6,060 m^3/s) in 1983 and 209,000 ft^3/s (5,290 m^3/s) in 1984. These flows are about 17% higher than the historical average discharge of 180,000 ft^3/s (5,100 m^3/s). Velocities in the St. Clair River approach 6 ft/s in the navigational channel and near channel velocities range from 0.3 to 2.8 ft/s. Total flushing time from Lake Huron to Lake St. Clair is normally about 21 hours, and about one-third of this time is required to flush the delta area. Stag Island, 8.7 mi (14 km) downstream from Lake Huron and Fawn Island 21.7 mi (35 km) downstream, are the only islands in the upper section of the St. Clair River. The delta area includes Russell, Harsens, Dickinson, and Seaway islands.

Lake St. Clair has a surface area of about 430 mi^2 (1,114 km^2), a mean depth of 11 ft (3.4 m), and a maximum natural depth of 21 ft (6.4 m). A navigation channel 18 mi (29 km) long has a statutory depth of 27 ft (8.2 m) and bisects the lake from the mouth of the South Channel of the St. Clair River to the head of the Detroit River. These data are based on the Great Lakes low water datum of 573.3 ft (174.7 m) above mean sea level, and in 1983-84 water levels were 3.25 ft (1.0 m) above this level. Major tributaries are the Clinton River on the United States side and the Sydenham, Thames, Belle, and Ruscom rivers on the Canadian side. Flushing time of the lake is 5 - 7 days.

The upper Detroit River is 13 mi (21 km) long and receives water from Lake St. Clair. The lower Detroit River, 18.9 mi (30.5 km) long, begins at the head of Fighting Island where the river separates into three channels (Trenton, Livingstone, and Amherstburg). Major tributaries are the Rouge River and the Ecorse River on the U. S. side. Width of the river ranges from 1,970 to 4,920 ft (600 - 1,500 m) in the upper sections, and from 4,920 to 10,400 ft (1,500 - 3,000 m) in the lower section. Mid-channel depths are 20 - 49 ft (6 - 15 m) and littoral depths are 7-20 ft. Excluding the islands, all but 6.9 mi of shoreline is bulkheaded. The mean annual discharge rate of the Detroit River into Lake Erie was 217,000 ft^3/s (6,140 m^3/s) in 1983 and 215,000 ft^3/s (6,090 m^3/s) in 1984. These flows are about 17% higher than the historical average discharge of 185,000 ft^3/s (5,200 m^3/s). Average flow velocities are 2 - 6 ft/s (0.6 - 1.8 m/s) in the mid-channel region and 0.1 - 1.9 ft/s in the nearshore and near channel areas. Total flushing time from Lake St. Clair to Lake Erie is about 19 hours in the main channel. The upper river contains two large islands, Peach Island and Belle Isle, and the lower river contains Fighting Island, Grosse Ile, Bois Blanc, and several small islands.

The climate in the study area is semi-maritime due to its proximity to lakes Huron and Erie. The mean annual surface air temperature is 9 - 10°C, however, intense cells of cold arctic air can lower temperatures as much as 28°C over a 24-hour period. Air temperatures averaged 4.6°C lower from December to March in 1983-1984 than in 1982-1983. Average air temperatures were 1.0°C higher in April-June and 1.7°C lower in July-September 1984 than in 1983.

High winds and storms are common and significantly affect the thermal budgets of Lake Huron and the SCDRS. Prevailing winds are from the west, although winds come from all directions. High winds generate seiches and surges that strongly affect the lower Detroit River, causing levels to drop or rise 2-3 ft. Wind speed and direction can also affect ice buildup and cause ice jams in the St. Clair River. Typically the river remains clear of ice and only a narrow band of shore ice forms along the banks of the St. Clair River, except in the delta area. However, ice may enter the St. Clair River from Lake Huron under the influence of northerly winds. The current carries this ice downstream until it meets resistance from solid ice cover in the delta or in Lake St. Clair. When large amounts of ice enter the system, the ice accumulation may extend upstream from Lake St. Clair nearly to Port Huron.

During most of the winter, a large natural ice arch forms at the outlet of Lake Huron and prevents ice from entering the river. This condition usually lasts through the winter, but strong southerly winds, particularly in March and April, may disrupt the ice arch and push ice away from the river mouth. If the ice arch does not re-form, a north wind can then push the ice field back into the river in large quantities, as it did in 1901 (Cole 1903), 1920, 1942, and 1984 (COE 1984).

In 1984 the ice jam in the St. Clair River lasted from April 5 to 30 (COE 1984). On April 1, no ice was in the St. Clair River, but a large pack of ice covered the southern portion of Lake Huron. On April 5 a large amount of ice was reported floating downstream in the vicinity of Marine City. By April 7, pack ice extended from Marysville to the lower cutoff channel. The large ice pack in Lake Huron and persistent north winds in April choked the St. Clair River with ice until April 30. Ice thickness of 8 ft was reported. Water temperature during April in the St. Clair River was about 6°F lower than normal and flow was reduced by almost 95,000 ft^3/s, resulting in a 2-ft drop in Lake St. Clair water levels, which persisted for about 3 days. During April at least 140 vessels were assisted through the St. Clair River by four Coast Guard ice breakers. Vessel movement through the river at this time was slow and difficult and, several vessels ran aground.

The upper Detroit River usually does not freeze over, except in the broad, shallow area between Belle Isle and the United States mainland. Minor ice jams occur when large quantities of floe ice come down from Lake St. Clair and encounter the narrow channel and shallow ice covered areas in the lower river, that block downstream passage of the floe ice. Easterly winds also move Lake Erie ice into the lower river, causing ice jams. Ice cover develops in the lower river in the broad, shallow expanses adjacent to the many islands; however, the main navigation channels are generally open. Occasionally the river fills completely with ice, when there is heavy ice movement from Lake St. Clair and the river mouth is blocked by ice from Lake Erie (Derecki 1984 c).

In several areas within the SCDRS the concentrations of toxic materials in sediments are elevated, and it has been demonstrated (Limno-Tech, Inc. 1975) that contaminants affect the health and abundance of fish, macrophytes, and particularly, macrozoobenthos. Concentrations of pollutants in the sediments of SCDRS are relatively high and some exceed criteria set by the U.S. Environmental Protection Agency (EPA). These pollutants include polychlorinated biphenyls (PCB), hexachlorobenzene (HCB), octachlorostyrene (OCS), phenol, polyaromatic hydrocarbons, (PAH), cyanide, oil and grease, cadmium, chromium, and mercury. The contaminated areas tend to be near shore, and near point sources, but also occur in depositional areas far removed from known point sources. The distribution of contaminants in sediments is difficult to assess--as it is typically in riverine environments. The major point source in the St. Clair River is the Sarnia, Ontario, industrial complex. The reported ranges of concentrations of contaminants in the upper St. Clair River follow: PCB, 0-10,000 ppb; OCS, 1-193 ppb; oil and grease, 250-260 ppm; and

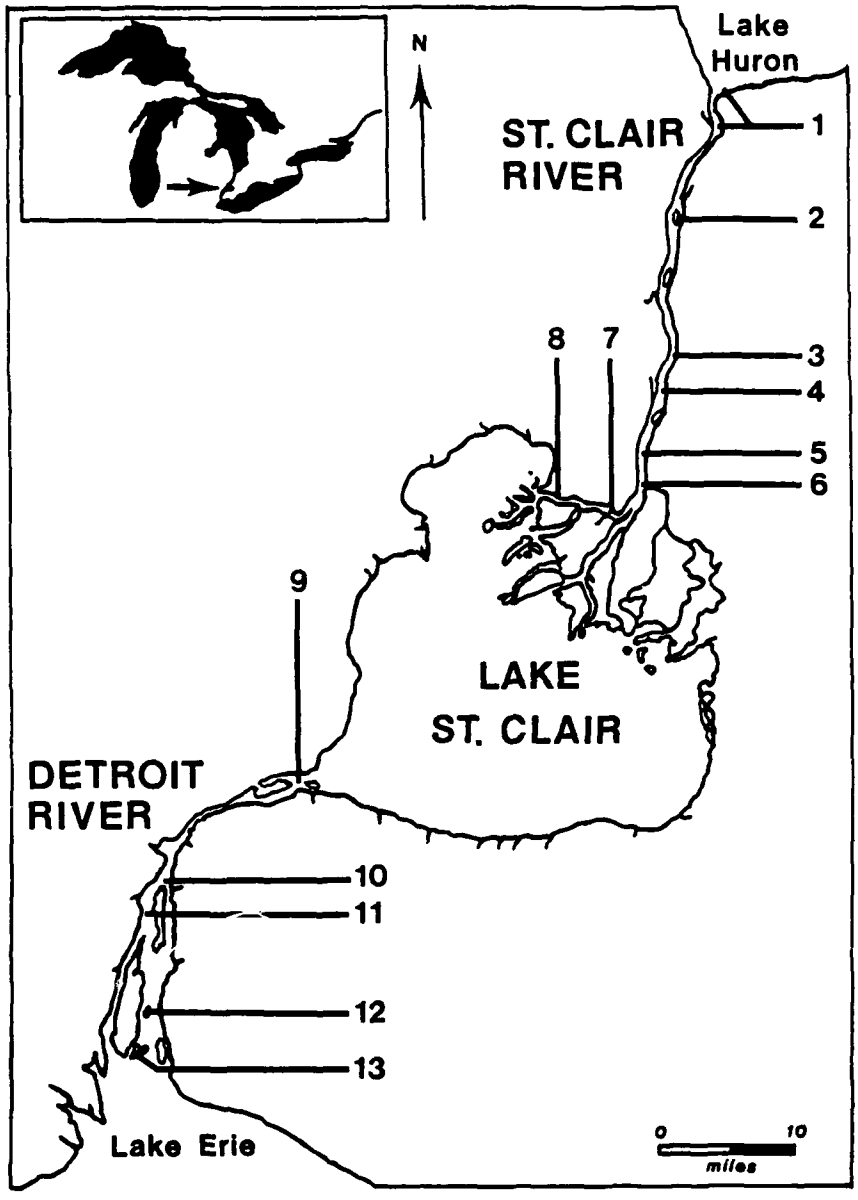

Fig. 2. Sampling locations for fish eggs:

1. Point Edward
2. Stag Island
3. St. Clair Power Plant
4. Marine City
5. Roberts Landing-Locust Point
6. Port Lambton-Baby Point
7. Point Aux Chenes
8. Belle Harbor
9. Peach Island
10. Fighting Island
11. Grassy Island
12. Stony Island-Crystal Bay
13. Sugar Island-Hickory Island

mercury, 0.1-58 ppm. PCB levels exceed the Ontario guidelines (50 ppb) and IJC objectives (100 ppb), and mercury in certain areas (>1 ppm) exceeds the EPA guideline. No standards exist for OCS in sediments. Oil and grease levels are judged acceptable in most areas. Limited sampling has indicated that concentrations of contaminants are lower in the St. Clair delta. Deposition of sediments in Lake St. Clair, in the mid-lake area near the navigational channel, has resulted in the following ranges of concentrations: PCB, 5-30 ppb; HCB, 36-99 ng/g; OCS, 1-30 ppb; cadium, 1-2 ppm; and mercury, 1-3 ppm. Cadmium (>1 ppm) exceeds Ontario's guidelines and mercury levels can be classified as constituting heavy pollution; no guidelines exist for HCB in sediments. The entire Detroit River--particularly the lower section associated with the industrial complex on the U.S. shore--is the most severely polluted area in SDCRS. Pollutants include PCB (20-3800 ppb), HCB (0-36 ppb), OCS (1-10 ppb), oil and grease (100-29,000 ppm), cyanide (0.25-2.94 ppm), phenols (0-1 ppm), chromium (4-330 ppm), mercury (0-8 ppm), and cadmium (0-17 ppm). PCB, oil and grease, cyanide, chromium, cadmium, and mercury levels exceed EPA's guidelines for heavily polluted sediments. (No standards exist for phenol or PAH.) A total of 15 PAH compounds have been found at detectable levels and mean concentrations measured have been as high as 39 ppm for individual compounds. Some of these data were collected in the 1970's and some pollutants have declined since then. More data are needed to provide a comprehensive and current assessment of sediment contaminant levels and to establish standards.

MATERIALS AND METHODS

We attempted to locate stations in the field by triangulation, using fixed visual reference points on the shorelines and by Loran-C navigation. Our previous experience with Loran-C on Lake Erie showed it to be a rapid and reliable technique that enabled us to consistently return to within about 16 m of previously marked locations. We anticipated similar results from Loran-C in SCDRS, but apparently the proximity of shoreline structures, electrical interference, or other conditions distorted the signals received by the Loran-C unit aboard our boat and yielded coordinates for a given location that were grossly unreliable. Although we continued to record Loran-C readings throughout the 2 years of the study, we relied mainly on triangulation and visual reference fixes to locate the stations at which we collected samples. We cannot define the accuracy and precision of the triangulation methods we used, but believe that the approach was adequate to permit us to satisfactorily locate established stations within about 30 m.

Locations for collecting fish eggs (Fig. 2; Appendix 1) were selected because they were described by Goodyear et al. (1982) as spawning areas for walleyes, yellow perch, and lake sturgeon. A total of 159 stations were visited at the 13 locations to collect fish eggs. Sampling was conducted in April-June in 1983 and in May - July in 1984 (Table 1). Sampling was scheduled to begin in April 1984, but was delayed until May due to an unusually severe ice jam in the St. Clair River.

Table 1. Dates and locations (station numbers[a/]) of pumped sampling for fish eggs in the St. Clair and Detroit rivers.

Dates		
April 12-16, 1983 May 15-17, 1984	May 10-12, 1983 June 14-15, 1984	June 7-10, 1983 July 17-18, 1984
9 - 32	1 - 8	41 - 44
45 - 60	33 - 40	51
114 - 137	91	53 - 54
140	100 - 113	56 - 57
142	122	63 - 113
144 - 153	125	138 - 139
155	130 - 135	141
157	138 - 139	143
	141	154
	143	156
	150	158 - 159
	153 - 159	

[a/] See Appendix 1 for locations of stations.

Fish eggs were collected with a 3-horsepower gasoline-powered centrifugal pump system capable of delivering about 100 gal/min (371 L/min) through a hose 2 inches (5.1 cm) in diameter. The pump intake head was moved along the river bottom and the pump discharge was strained through a nested series of sieving boxes to separate the larger debris from the finer sediments and the eggs, which accumulated in a plankton net constructed of 355 μm Nitex. The material that accumulated in the plankton net after 5 minutes of pumping was considered to be a sample. One such sample was collected at each visit to a station. Water depth and surface water temperature were recorded, and bottom type was determined from a Ponar dredge sample collected at each station at the time of sampling. Samples were preserved in 10% formalin and taken to the laboratory for analysis.

In the laboratory, eggs were extracted manually from the samples under a dissecting microscope at magnifications of 7 - 30 X, counted, and stored for identification. Attempts to identify fish eggs to species were severely impeded by the lack of suitable keys. However, we were able to use the information published by Auer (1982) to compile a decision table (Table 2) that allowed us to identify the eggs to species on a "most probable" basis. Key characteristics were egg diameter, unique egg structures (such as oil globules), preferred spawning temperatures, and spawning season. Other egg characteristics such as color and adhesiveness were altered by formaldehyde and could not be used to identify preserved eggs.

The procedure used to identify eggs was as follows: first, each egg sample was washed through a nested series of three sieves (mesh sizes of 2.0, 1.0, and 0.5 mm) to sort the eggs into small (0.9 mm), medium (1.0-1.9 mm), and large (2.0 mm) size groups. Most samples contained eggs in only one size group, but occasionally two size groups were represented in a single sample. Subsamples of each size group represented in a sample were then examined under a microscope for definitive characteristics. Egg diameters were measured with an ocular micrometer. Referring this information to the species decision table usually narrowed the choices to one or, at most, a few species. When more than one choice existed, we compared water temperature records at the time of sample collection with preferred spawning temperatures of the species being considered and made the identification on that basis. No statistical analyses were performed on the fish egg data because the number of eggs identified was too small.

Fish were sampled at a total of 51 stations along 15 cross-river transects in SCDRS (Fig. 3, Appendix 2). Transects II, IV, V, and XII were located in the lower reaches of the Black, Pine, and Belle rivers, and the River Rouge, respectively--major U.S. tributaries to the St. Clair and Detroit rivers. A single mid-channel station was located along each of these four transects. The remaining 11 transects were in the main St. Clair and Detroit rivers; three to five stations were located on each of these transects, depending on the depth and width of the river.

Fish were collected with a 0.5 m cylinder-on-cone townet constructed of

Table 2. Key characteristics of eggs and spaw[illegible]f common fish species in the St. Clair and Detroit rivers (after Auer, 1982).

Species	Egg diameter (mm)	Oil globule	Spawning season	Spawning temperature (°C)	Miscellaneous
Lake sturgeon	3.2-3.5		Spring	11-16	Very tough
Longnose gar	3.3-3.5		Late spring - early summer	18.9-21.2	Similar to sturgeon eggs
Shortnose gar	1.5		May - June		Surrounded by gelatinous substance
Alewife	0.95-1.27	Tiny droplets	May - August	10-27	Pelagic
Gizzard shad	0.9-1.1	One large (0.2 mm); 1-5 droplets	April - June	10-24	
Lake whitefish	2.0-3.0	Between 100 and 200; largest 0.2 mm	October - December	4-12; peak 8	Chorion colorless, yolk amber
Rainbow smelt	0.9-1.3	Numerous	April - May	4-15; peak 10	
Mud minnow	1.6	Small and highly refractive		12.8-15.6	In algal nests
Northern pike	2.2-3.0	Numerous and small; in clusters	March - May	4-11	Surface of chorion obscurely reticulate
Goldfish	1.0-1.7	Many sparsely scattered droplets (0.01-0.05 mm) in yolk	May or June	16	Perivitelline space narrow (0.1 mm)
Common carp	1.5-2.1		Mid-May - early June	15-25	Perivitelline space 0.2-0.3 mm
Silver chub	0.8-1.3		Mid-June - mid-August	Begins at 18; most above 21	
Golden shiner	1.0-1.4	None	May - August	20-21; ceases above 27	
Emerald shiner	3.0-3.3		April - mid-August	Begins at 22	Over hard sand and mud
Spottail shiner	1.0-1.4	None	June - July	15-20	Not attached to substrate
Quillback	2.0-2.2	None	Late April - Mid-June	10-28	
White sucker	2.0-3.6	None	April - mid-May	7.2-10	
Shorthead redhorse	2.0-3.3	None	May	11-16	

Table 2 (Cont'd)

Species	Egg diameter (mm)	Oil globule	Spawning season	Spawning temperature (°C)	Miscellaneous
Brown bullhead	3.0		April - June	18.5-25.8	
Channel catfish	3.5		Spring and summer	21.1-29.5	
Tadpole madtom	2.8-3.5		May - July		
Trout-perch	1.3-1.9	Single (0.7 mm)	May - August	4.4-10; 15 and 15.6-20	Spawns on beaches and over gravel
Burbot	1.0-1.7	Single; large and clear	December - March	0.4-4.0	Spawning period incompletely known
Brook silverside	1.1-1.4	Numerous (0.1-0.5 mm)	May - August	20-23	
White perch	0.7-0.8	Single; sometimes many small globules (0.2-0.4 mm); amber	Mid-May - late June	11-15	Single attached disk on chorion
White bass	0.7-1.0	Single (0.25-0.3 mm)	April - June	12-16; up to 24	Perivitelline space 0.04-0.8 mm
Pumpkinseed	0.8-1.2	Largest 0.3-0.4 mm; sometimes 1-2 minute droplets	May - August	17.5-29	Eggs in nests or attached
Bluegill	1.2-1.4	Single (0.38 mm)	May - August	17.2-30.5	Nests on gravel, sand, clay, or mud bottom
Smallmouth bass	1.8-2.8	One large (0.9-1.7 mm); numerous smaller droplets	April - June	12.8-23.9	Spawns on rock, gravel, and coarse sand
Largemouth bass	1.4-2.0	Usually single (0.65-0.7 mm); a few small ones may be present	April - July	16-23.9	Eggs are attached to stones, roots, detritus, etc.
White crappie	0.8-0.9	Large and single	April - July	14-23	Spawns on rocks, gravel, sand, clay, mud, roots, or tree leaves
Black crappie	0.9	Single	April - July	17.4-20	Nests constructed on clay or mud, but sand and gravel preferred
Johnny darter	1.4-1.5	Single and large	April - June	11.7-21.1	Deposits eggs on underside of rocks, logs, and other debris

Table 2 (Cont'd)

Species	Egg diameter (mm)	Oil globule	Spawning season	Spawning temperature (°C)	Miscellaneous
Yellow perch	1.9-2.8; sometimes - 3.5	Single; amber or clear yellow (0.4 mm)	April - June	7.2 and 11.1 but also at 5.6-18.5	Yolk light amber
Logperch	1.09-1.15	Single and large or numerous and small (0.43 mm)	April - July	10-15	Attachment disk present; granular yolk (0.77 mm); spawns on sand
Walleye	1.5-2.1	Single	April - May	3.3-14; mostly 4.4-10	Eggs broadcast over large unguarded areas of coarse gravel, rocks and boulders
Freshwater drum	1.0-1.7	Single; sometimes with smaller globules (0.6-0.7 mm)	April - August	18-25	Yolk diameter 0.9-1.1 mm
Mottled sculpin	1.3	Single	March - May	5.6-16.7	Short spawning period (2 to 5 days)
Slimy sculpin	2-3		April - June	3.0-11.5	

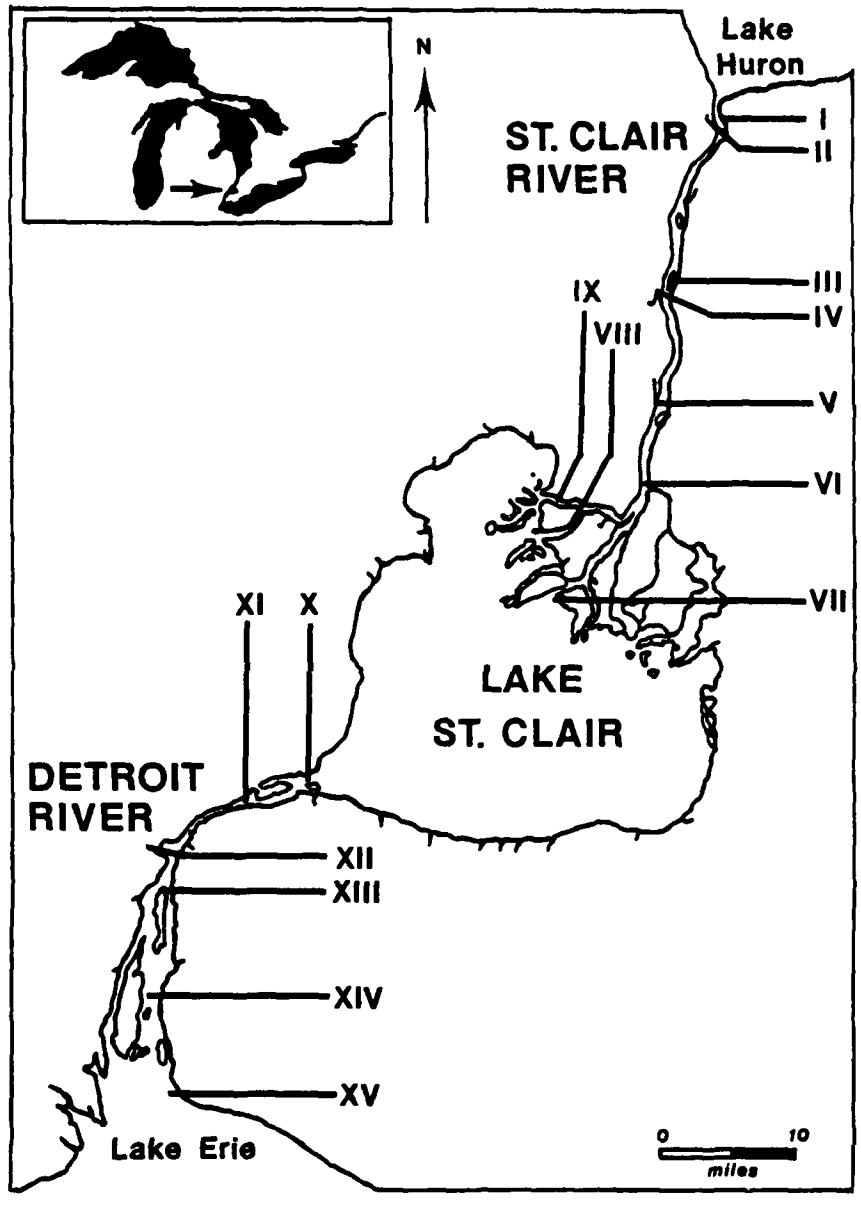

Fig. 3. Sampling transects for fish larvae:

I. Port Huron
II. Black River Mouth
III. St. Clair
IV. Pine River Mouth
V. Belle River Mouth
VI. Willow Point
VII. Cutoff Channel
VIII. Middle Channel
IX. North Channel
X. Upper Belle Isle
XI. Lower Belle Isle
XII. River Rouge Mouth
XIII. Fighting Island
XIV. Stony Island
XV. Bois Blanc Island

355 µm Nitex (Fig. 4). The net was lashed to a 0.5-m net ring suspended in a square frame, with the towing bridle attached to the four corners so that the bridle wires were not directly in front of the net opening when the net was in tow. A General Oceanics Model 2030 digital flowmeter was mounted inside the net as it was towed, and a second flowmeter was mounted outside the net to allow monitoring of net filtering efficiency (Hatcher and Nester, 1983).

The net was towed against the current at about 3 knots (true water speed) while a constant towing cable angle of 67° (as determined with an inclinometer) was maintained. Net deployment was done in a stepwise manner by towing the net for 1 minute at each sampling depth, beginning at the surface and successively lowering the net by 2-m depth increments until the depressor plate touched bottom. It was then retrieved rapidly with a power winch. The net was rinsed and the sample in the net bucket was preserved in 10% formalin for analysis. Surface water temperature, water depth, fishing depth, towing time, and flowmeter readings were recorded for each tow. A total of 1,020 townet samples were collected during this study. Duplicate tows were made monthly, April-August 1983 and May-September 1984 at each of the 51 stations along 15 transects in SCDRS (Table 3).

In the laboratory, fish were extracted from the townet samples with the aid of a dissecting microscope at 7 - 30 X magnification, and stored in 30% ethanol until they could be identified. We examined all samples twice because newly hatched larvae were small and difficult to see, especially in samples that contained abundant plankton. Fish extracted during the second examination of a sample usually constituted less than 5% of the number extracted during the first examination, and many samples yielded no additional fish during the second examination. We identified fish as yolk sac larvae, non-yolk sac larvae, or juveniles under a dissecting microscope at 7 - 60 X magnification, using the keys of Nelson and Cole (1975), Boreman (1976), Hogue (1976), Cooper (1978), Auer (1982), and Fuiman et al. (1983). We also used a reference collection of fish larvae assembled by the Great Lakes Fishery Laboratory staff during previous work on the St. Clair and Detroit rivers. Fish that we were unable to identify with certainty were forwarded for verification to John Cooper, Institute for Coastal and Marine Resources, Greenville, North Carolina; and Charles Hatcher and Robert Nester, Great Lakes Fishery Laboratory, Ann Arbor, Michigan.

We used automated data processing techniques to analyze field and laboratory data sets. As a first step, we examined raw data for errors, using the computer to generate data verification plots. Data points outside the range of expected values were immediately apparent and easily checked to determine if they were faulty. These suspect data points were usually traceable to recording errors or faulty equipment. Each error was corrected, or the suspect data point was discarded. Estimated substitute values were not used. The occasional malfunctioning of flowmeters resulted in the loss of a few data points needed to calculate the density of fish larvae, but these missing data points did not significantly affect our analyses.

Estimates of the density of fish larvae, expressed as the number of larvae per 1000 m^3 of water strained, were obtained by dividing the total

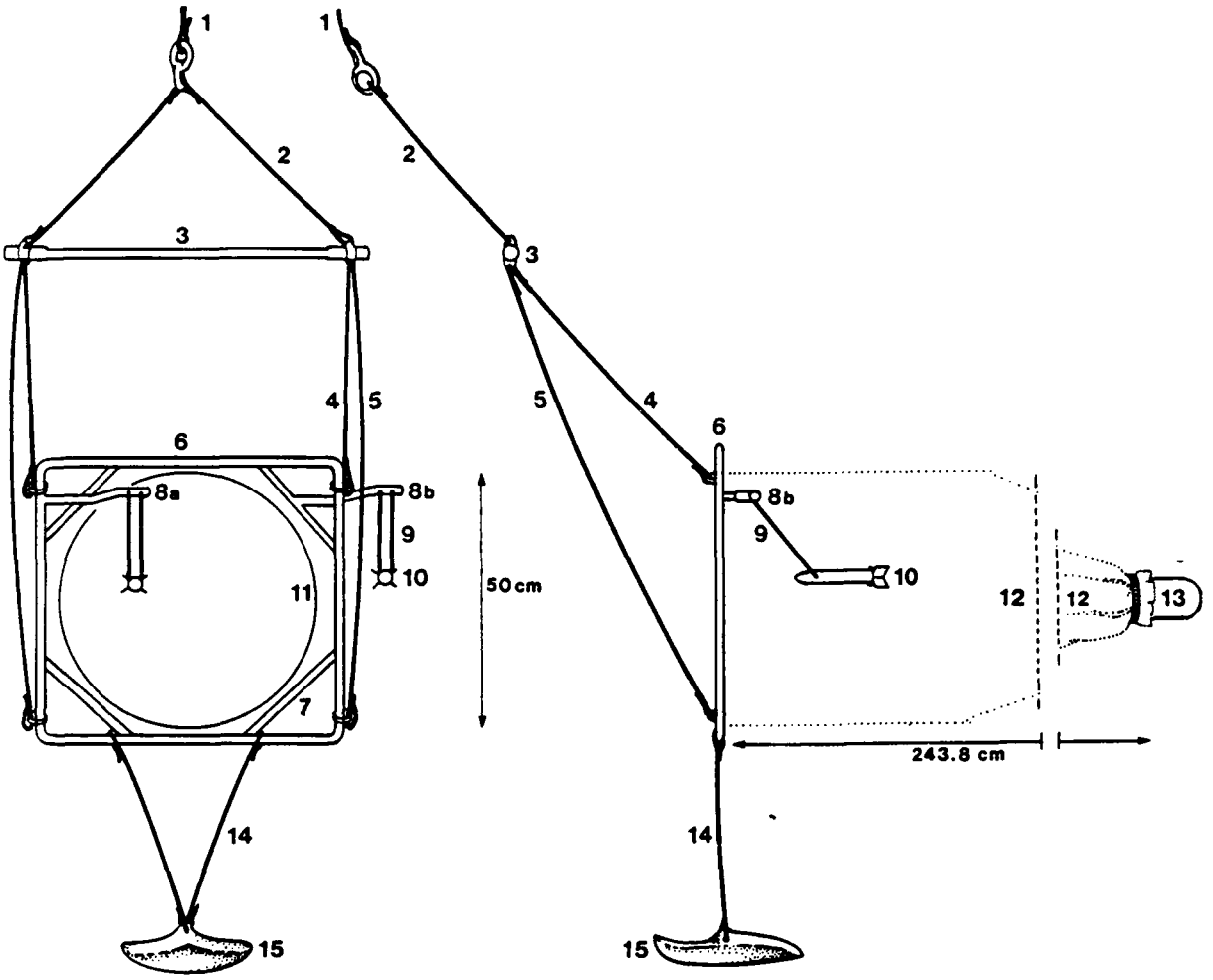

Fig. 4. Front and side views of cylinder-on-cone townet (after Hatcher and Nester, 1983).

1. Towing cable
2. Fore-bridle
3. Spreader bar
4. Side cable
5. Side cable
6. Net frame
7. Net grame corner supports
8. Flowmeter support brackets
9. Flowmeter support cable
10. Flowmeter
11. Net ring
12. Net
13. Net bucket
14. Depressor cable
15. Depressor plate

Table 3. Dates and locations of townet sampling for fish larvae in the St. Clair and Detroit rivers and their major U.S. tributaries.

River	Transects	1983					1984				
		April	May	June	July	Aug.	May	June	July	Aug	Sep
St. Clair	I-IX	20-21	14-15	13-14	12-13	9-10	18-19	16-17	19-20	14-15	19-2
Detroit	X-XV	18-19	12-13	11-12	12-14	11-12	20-21	18-19	21	16	18

number of yolk-sac and non-yolk-sac larvae captured in each set of duplicate tows at a station by the total volume (cubic meters) of water strained during those tows, and multiplying the result by 1000.

Analysis of Variance (ANOVA) and, when appropriate, Tukey's studentized range test were used to test for significant temporal and spatial differences in the density of all species combined and of alewife larvae (too few larvae of other species were taken to permit statistical analysis by species). We also tested the significance of correlations between the abundance of larvae, and the physical variables of water temperature, and fishing depth. The 5% level of significance ($P = 0.05$) was adopted for all statistical tests. We performed these analyses with the main frame computer of the Michigan Terminal System on the University of Michigan campus, using the Statistical Analysis System (SAS) program.

All field data collected each time sampling was conducted in 1983 and 1984 are given in Appendices 3 and 4.

RESULTS AND DISCUSSION

Water Temperatures and Warming Rates

Inasmuch as water temperatures and warming rates are considered to be important factors affecting the time of fish spawning, the time of egg hatching, and the survival of eggs and larvae (Busch et al. 1975), we recorded surface water temperatures at all stations (Table 4; Appendices 3 and 4) to determine if the abundance of eggs and larvae in 1983 and 1984 was influenced by temperature. We also obtained water temperature data collected in 1977 and 1978 (Hatcher and Nester 1983) at several of the same transects that were sampled during the present study. Finally, we acquired mean monthly temperature data for 1983-1984 from the Port Huron and Detroit municipal water intakes (Table 5) to permit us to describe water temperature trends for each river.

Differences in water temperatures between years and between rivers in 1983-1984 were evident (Table 4). Temperatures in the St. Clair River (transects I-IX) were similar in May during both years, but in June were nearly always 3-5°F lower in 1983 than in 1984. In July and August, temperatures were about 1-2°F lower in 1983 than in 1984. Although these year-to-year differences are small they nevertheless indicate that the rate of water warming was slower in 1983 than in 1984. The portion of the Detroit River represented by transects X-XV did not demonstrate this consistent difference in warming rate between years, but since the temperatures in June and August were about 3-6°F lower in 1983 than in 1984, the net effect was generally one of lower summer water temperatures in 1983. Water temperature differences between rivers during May-August in 1983-1984 (Tables 4 and 5) were also evident. Lake St. Clair acts as a warming basin raising water temperatures in the Detroit River about 5°F above those in the St. Clair River during May, June, and July, when many species spawn. Temperatures in the St. Clair River were consistently

Table 4. Mean surface water temperatures (°F) at townet stations in the St. Clair and Detroit rivers and their major U.S. tributaries.

Transect	Station	April	May		June		July		August		Sept
		1983	1983	1984	1983	1984	1983	1984	1983	1984	1984
					St. Clair River						
I	1	38	45	44	54	57	64	65	71	72	62
	2	38	45	43	50	56	63	65	71	72	61
	3	38	43	44	49	56	63	65	71	71	60
II	1	41	59	55	66	64	70	69	77	77	62
III	1	38	45	44	54	57	64	65	72	72	61
	2	38	44	44	53	56	64	65	72	72	61
	3	38	44	44	51	56	64	65	72	72	61
IV	1	40	51	46	72	63	69	68	74	75	64
V	1	41	61	52	71	68	75	70	76	78	64
VI	1	40	47	46	54	58	65	66	73	73	62
	2	40	47	46	54	58	65	66	73	73	62
	3	40	44	44	52	57	64	66	72	72	61
	4	40	45	45	51	57	64	66	72	72	61
	5	40	47	48	54	59	68	67	75	75	62
VII	1	41	45	45	52	57	64	66	71	72	62
	2	41	45	45	52	57	64	66	71	72	62
	3	41	45	45	52	57	64	66	71	73	62
	4	41	45	45	52	57	64	66	71	73	62
	5	41	45	45	53	57	64	66	71	73	62
VIII	1	40	45	44	53	58	65	66	72	73	63
	2	40	45	44	53	58	65	66	71	73	63
	3	40	45	44	53	58	65	66	71	73	63
	4	40	45	45	53	58	65	66	71	73	63
	5	40	45	46	53	58	65	66	71	73	63
IX	1	40	46	45	54	58	65	66	72	73	63
	2	40	46	45	53	58	65	66	71	73	63
	3	40	45	45	53	58	64	66	71	73	63
	4	40	45	45	53	58	65	67	71	73	63
	5	40	45	59	53	58	65	67	72	73	63
					Detroit River						
X	1	41	54	51	59	65	71	70	71	76	64
	2	41	53	49	58	65	71	69	71	75	63
	3	41	50	49	60	66	70	69	70	75	65
	4	41	52	50	60	67	70	71	70	76	64
XI	1	42	54	51	59	66	72	70	71	76	64
	2	42	51	48	57	65	72	69	71	74	63
	3	42	51	49	59	67	72	71	70	76	64
XII	1	42	58	55	64	70	76	76	76	80	66
XIII	1	41	56	52	60	66	72	71	73	76	64
	2	41	52	51	59	67	72	69	72	76	63
	3	41	51	49	59	67	70	70	72	75	64
	4	41	51	50	60	67	70	70	72	76	64
XIV	1	41	51	49	60	66	72	70	73	76	64
	2	39	51	49	60	66	72	70	73	76	64
	3	39	51	48	60	67	72	70	73	76	64
	4	39	52	49	60	67	72	70	73	76	64
	5	39	54	49	60	70	72	71	72	76	65
XV	1	41	51	51	62	66	71	70	73	75	64
	2	41	51	50	61	66	71	70	72	75	63
	3	41	51	51	61	67	71	71	72	75	64
	4	41	51	49	60	67	71	71	72	75	64
	5	41	52	51	61	68	71	71	72	76	64

Table 5. Mean monthly water temperatures (°F) in the St. Clair and Detroit rivers at the water intake of the cities of Port Huron Detroit.

Year	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
						St. Clair River[a/]						
1974	34	33	35	39	47	53	64	69	65	54	49	30
1975	36	--	34	37	49	57	67	71	62	57	51	40
1976	33	34	35	41	48	59	66	69	65	55	43	34
1977	33	33	35	40	51	59	67	69	--	55	48	38
1978	33	33	33	38	--	56	65	--	66	55	48	38
1979	33	33	34	38	46	56	64	69	66	57	48	40
1980	34	33	34	40	49	55	66	71	66	55	45	37
1981	33	34	35	41	48	59	70	71	66	55	48	38
1982	34	33	33	38	50	56	66	70	63	58	49	42
1983	33	34	33	33	44	57	66	71	63	55	46	40
1984	33	34	33	33	44	57	66	71	63	55	46	40
Average	34	33	34	39	48	57	66	70	65	56	47	39
						Detroit River						
1973	33	33	35	43	50	63	70	73	69	60	46	37
1974	33	33	34	41	51	61	70	72	65	53	47	36
1975	34	33	34	39	55	64	72	72	63	56	48	37
1976	33	33	37	47	51	68	70	71	65	52	39	33
1977	33	33	35	45	57	65	73	71	68	54	47	34
1978	33	33	33	40	53	64	70	73	69	54	47	36
1979	33	33	34	41	52	62	69	70	67	56	46	38
1980	34	33	34	42	54	62	71	73	68	54	43	35
1981	33	33	35	46	52	65	73	73	66	53	46	38
1982	33	33	34	40	57	63	71	72	66	57	47	40
1983	35	34	38	42	51	63	73	75	70	58	45	36
1984	33	34	34	42	49	64	70	74	66	57	45	38
Average	33	33	35	42	53	64	71	72	67	55	46	37

[a/] Dashes indicated data not available.

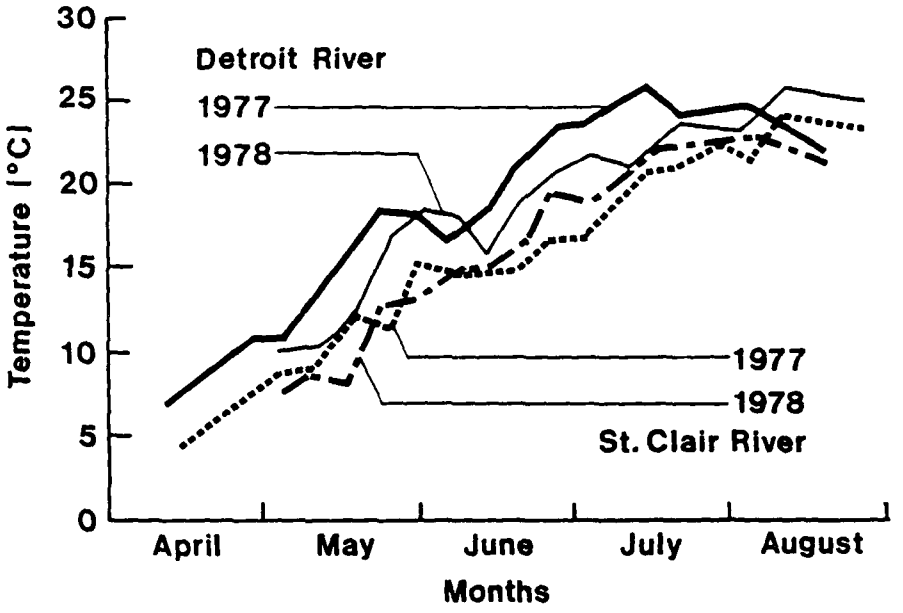

Fig. 5. Mean surface water temperature (°C) in the Detroit River at transec V and VI in 1977 and at transects V-VIII in 1978, and in the St. Clair River at transects I-IV in 1977 and at transects II and IV in 1978 (Hatcher and Nester, 1983).

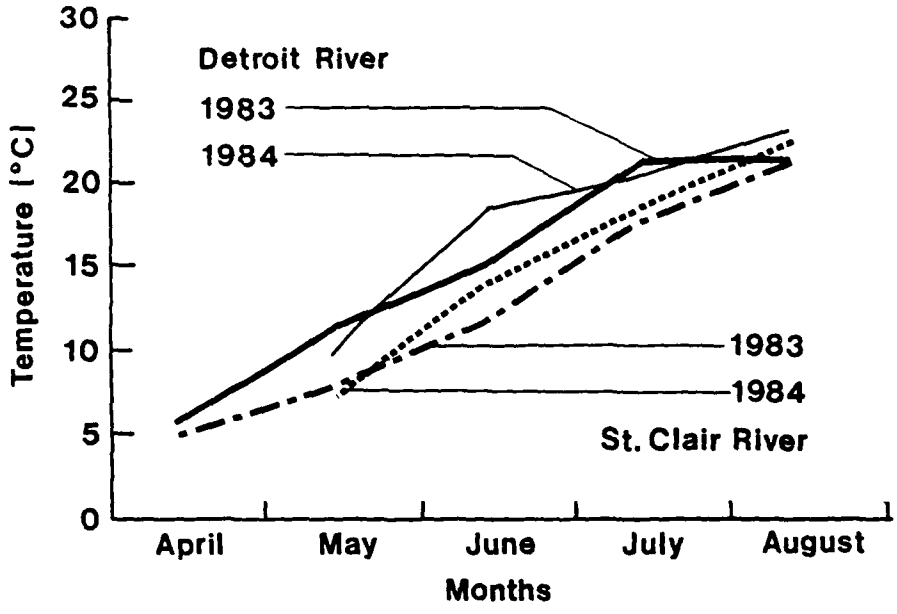

Fig. 6. Mean surface water temperature (°C) in the St. Clair River at transects I, III, VI, VII, VIII, IX, and in the Detroit River at transects X, XI, XIII, XIV, and XV in 1983 and 1984.

Table 6. Species of fish represented in catches of eggs and larvae made in the St. Clair and Detroit rivers and their major U.S. tributaries in 1983-1984.

Common name	Scientific name	Life stage collected	
		Egg	Larva
Sea lamprey	Petromyzon marinus		+
Alewife	Alosa pseudoharengus	+	+
Gizzard shad	Dorosoma cepedianum	+	+
Rainbow smelt	Osmerus mordax	+	+
Lake herring	Coregonus artedi		+
Lake whitefish	Coregonus clupeaformis		+
Common carp	Cyprinus carpio	+	+
White sucker	Catostomus commersoni	+	+
River carpsucker	Carpiodes carpio		+
Spotted sucker	Minytrema melanops		+
Spottail shiner	Notropis hudsonius	+	+
Emerald shiner	Notropis atherinoides		+
Sand shiner	Notropis stramineus		+
Mimic shiner	Notropis volucellus		+
White bass	Morone chysops	+	+
Rock bass	Ambloplites rupestris		+
White crappie	Pomoxis annularis	+	+
Burbot	Lota lota	+	+
Trout-perch	Percopsis omiscomaycus	+	+
White perch	Morone americanus	+	+
Freshwater drum	Aplodinotus grunniens	+	+
Brook silverside	Labidesthes sicculus		+
Johnny darter	Etheostoma nigrum	+	+
Logperch	Percina caprodes	+	+
Yellow perch	Perca flavescens	+	+
Walleye	Stizostedion vitreum vitreum	+	+
Central mudminnow	Umbra limi	+	
Northern pike	Esox lucius	+	
Mottled sculpin	Cottus bairdi	+	+
Slimy sculpin	Cottus cognatus		+
Deepwater sculpin	Myoxocephalus thompsoni		+

Table 7. Number of fish eggs collected in the St. Clair and Detroit rivers in 1983-1984.

River and species	Number of eggs	Percent of total for river
St. Clair		
Rainbow smelt	7,357	82
Gizzard shad	728	8
Alewife	458	5
Trout-perch	187	2
Johnny darter	127	1
Yellow perch	44	< 1
Walleye	1	< 1
Others	72	< 1
Total	8,974	
Detroit		
Gizzard shad	14,188	65
White bass	3,397	16
Rainbow smelt	1,414	7
White perch	827	4
Central mudminnow	483	2
Alewife	480	2
Yellow perch	282	1
Walleye	411	2
Others	341	1
Total	21,823	

Table 8. Number of fish eggs of different species collected in the St. Clair River in April-June 1983.

Species	April	May	June	Total	Percent of total for all species
Alewife	--	--	456	456	6.6
Gizzard shad	--	1	714	715	10.3
Rainbow smelt	3,679	1,507	372	5,558	79.8
Trout-perch	--	--	168	168	2.4
Logperch	--	--	7	7	0.1
Yellow perch	--	--	25	25	0.4
Mottled sculpin	--	3	--	3	< 0.1
Unidentified	--	18	11	29	0.4
Total	3,679	1,529	1,753	6,961	

Table 9. Number of fish eggs of different species collected in the St. Clair River in May-July 1984.

Species	April	May	June	Total	Percent of total for all species
Alewife	--	2	--	2	0.1
Gizzard shad	--	13	--	13	0.6
Rainbow smelt	1,792	27	--	1,799	89.4
Trout-perch	9	10	--	19	0.9
White perch	--	6	--	6	0.3
Common carp	--	--	2	2	0.1
White sucker	2	1	--	3	0.1
Johnny darter	--	127	--	127	6.3
Yellow perch	14	5	--	19	0.9
Walleye	--	1	--	1	< 0.1
Unidentified	--	22	--	22	1.1
Total	1,797	214	2	2,013	

lower in 1983 than in 1977 and 1978, but temperatures in 1984 were similar to those in 1978 (Figs. 5 and 6). In the Detroit River, temperatures were generally similar in 1978, 1983, and 1984, and were lower than in 1977.

Species Composition and Abundance of Fish Eggs

Of the more than 31 species collected during this study (Table 6; Appendices 5 and 6), at least 13 were represented by fish eggs collected in the St. Clair River in 1983-1984 (Tables 7-9). Eggs of rainbow smelt were the most abundant (82% of the total) followed by those of gizzard shad (8%), alewife (5%), trout-perch (2%), and johnny darter (1%). Yellow perch, walleyes, and lake sturgeon were selected as species of special interest. In the St. Clair River, yellow perch and walleye eggs made up less than 1% of the total egg catch, and no lake sturgeon eggs were taken (Table 7). Nearly 7,000 of the 8,974 fish eggs collected in the St. Clair River were taken in 1983 (Tables 8 and 9). Most of the eggs collected in April and May 1983 were identified as rainbow smelt, and those collected in June were mostly gizzard shad, alewife, smelt, trout-perch, and johnny darter. Eggs collected in 1984 in the St. Clair River were mostly smelt, nearly all of which were taken in May. Eggs of johnny darters, trout-perch, yellow perch, and gizzard shad eggs were among those most frequently collected in 1984.

Low water temperatures in the St. Clair River persisted through April and May during both years and probably extended the spawning season for smelt and increased the chances of collecting smelt eggs. The relatively large numbers of smelt eggs collected in June and the nearly total absence of eggs of other species in May probably reflects the delayed warming in 1983. Rapid warming in May and June 1984 probably enhanced spawning of many species and caused smelt spawning to be nearly completed in May or early June.

During 1983 and 1984, nearly 22,000 eggs of at least 19 species of fish were collected in the Detroit River (Table 6; Appendix 5), nearly 2.5 times the number of eggs collected in the St. Clair River during the same period. This difference suggested that the Detroit River was the more heavily used as a spawning area. Gizzard shad eggs were the most abundant (65% of the total), followed by white bass (16%), smelt (7%), white perch (4%), and alewife (2%). Walleye and yellow perch eggs composed 2% and 1% of the total, respectively, and were more abundant in the Detroit River than in the St. Clair River. No lake sturgeon eggs were taken in the Detroit River.

Year-to-year variations in egg abundance in the Detroit River differed from those observed in the St. Clair River in several ways. About 7,700 (35%) of the 21,823 eggs collected in the Detroit River were taken in 1983 (Tables 10 and 11). Eggs of smelt and yellow perch were most abundant in April and May and those of gizzard shad and white bass predominated in June. In 1984 (when no sampling was done in April), eggs of walleye and yellow perch were most abundant in May and those of gizzard shad and white bass in June.

Lower water temperatures in 1983 apparently decreased spawning success in the Detroit River, where most indigenous fish species are warm-water spawners.

Table 10. Number of fish eggs of different species collected in the Detroit River in April-June, 1983.

Species	April	May	June	Total	Percent of total for all species
Alewife	--	1	466	467	6.1
Gizzard shad	--	--	2,575	2,575	33.4
Rainbow smelt	666	727	--	1,393	18.1
Central mudminnow	--	--	483	483	6.3
Northern pike	7	--	--	7	0.1
Burbot	6	--	--	6	0.1
Trout-perch	--	3	21	24	0.3
White perch	--	--	182	182	2.4
White bass	--	--	2,016	2,016	26.2
Logperch	--	59	--	59	0.8
Yellow perch	82	70	35	187	2.4
Walleye	--	16	255	271	3.5
Mottled sculpin	--	9	--	9	0.1
Unidentified	19	1	--	20	0.3
Total	780	886	6,033	7,699	

Table 11. Number of fish eggs of different species collected in the Detroit River in May-July, 1984.

Species	May	June	July	Total	Percent of total for all species
Alewife	--	12	1	13	0.1
Gizzard shad	--	11,615	--	11,613	82.2
Rainbow smelt	21	--	--	21	0.1
White perch	--	645	--	645	4.6
White bass	--	1,381	--	1,381	9.8
Freshwater drum	--	15	--	15	0.1
Common carp	--	8	--	8	0.1
White sucker	18	--	--	18	0.1
Spottail shiner	--	14	15	29	0.2
White crappie	--	--	1	1	< 0.1
Yellow perch	94	1	--	95	0.7
Walleye	140	--	--	140	1.0
Unidentified	1	140	4	145	1.0
Total	274	13,829	21	14,124	

Rapid warming in May 1984 promoted spawning of most species and gizzard shad and white bass demonstrated the largest increase in number of eggs produced.

Distribution of Fish Eggs

Egg distribution in the St. Clair River varied markedly with month and year (Appendix 5). In April 1983, a few eggs were collected at nearly all stations sampled in the St. Clair River, but 100-400 eggs were collected at each of stations 13, 18, 24, 27, 30, and 31, in the vicinity of Stag Island. Station 51 near Port Lambton and stations 58, 60, and 61 near Chenal Ecarte' each yielded 250-500 eggs. In May, samples at most stations contained few or no eggs, but stations 1, 5, 7, and 8 near Point Edward each contained several hundred eggs. In the June samples most stations contained few or no eggs, but a few hundred eggs were collected at each of the Port Lambton and Chenal Ecarte' stations, and at stations 72 and 74 in the North Channel. Egg abundance in the St. Clair River in May 1984 varied from 10 to about 150 at nearly all stations. In June, 120 eggs were collected at station 1, but fewer than 10 were collected at each of the other stations. In 1984, egg sampling was continued into July because we had been unable to sample in April; however, only 11 eggs were collected in July in the St. Clair River--indicating that most fish had finished spawning.

In the Detroit River in April and May 1983, eggs were abundant at a few stations and scarce or absent at others. Samples from station 137 near Crystal Bay and station 149 near Hickory Island each contained more than 200 eggs in April, and station 150, southeast of Hickory Island, provided nearly 700 eggs in May. Eggs were distributed more uniformly in June; few eggs were collected from stations 83 to 95, but most other stations produced 100-400 eggs and station 101 (at the head of Fighting Island) yielded more than 1,200. In sampling in the Detroit River in May 1984, we collected eggs at only three stations: 131 at station 148 near Hickory Island, 37 at station 151, and 21 at station 146. In June, eggs were more uniformly distributed throughout the river except for a few locations where large egg concentrations occurred. From 20 to 100 eggs were taken at most stations, but stations 143, 153, and 154 each yielded over 1,000; station 135 yielded 2,219 and station 150 yielded 5,006. Only 21 eggs were collected in July in the Detroit River.

The relative abundance of fish eggs on various substrate types is shown in Table 12. Almost 70% of the eggs were collected from substrates composed of either sand or some combination of sand with mud, gravel, or clay. About 60% of the 159 stations sampled had such substrate.

Species Composition and Abundance of Fish Larvae

Fish larvae of at least 29 species were collected in SCDRS during the study (Table 6; Appendix 6). Although some larvae could not be identified to species, most could usually be identified to family level. Species distribution and abundance differed greatly between years and rivers and therefore is best described separately for each river.

Table 12. Percent of total number of fish eggs taken over differemt types of substrate and percent of total number of stations with each type of substrate.

Substrate type	Percent of total number of eggs	Percent of total number of stations
Sand and mud	30.0	11.9
Sand and gravel	23.2	28.3
Mud and clay	18.7	0.6
Sand	14.3	10.7
Mud	5.8	14.5
Sand and clay	3.1	10.1
Gravel and clay	2.5	9.4
Fine gravel	1.0	2.5
Coarse gravel	0.9	6.3
Organic debris	0.3	0.6
Mud and gravel	0.1	1.3
Clay	0.1	1.9
Rubble	< 0.1	1.9

In the St. Clair River a total of 2,056 fish larvae were collected from in 1983 (Table 13). Alewife larvae constituted more than 62% of the total and were nearly 4 times more abundant than smelt, which ranked second. Unidentified darter larvae were collected in large numbers in June and in smaller numbers during other months, and were the third most abundant larvae in the catch. Only small numbers of other species were collected, and many species were represented in the catch by only one or two fish. The catch of larvae in the St. Clair River in 1984, (Table 14) was about twice that in 1983. Of the 4,195 larvae taken in 1984, alewives were the most abundant (63% of the total), followed by logperch (13%) and emerald shiners (7%). Other species were relatively scarce. Neither lake sturgeon nor walleye larvae were collected from the St. Clair River in 1983-1984, but some yellow perch larvae were taken mainly in 1984.

The lower water temperatures and slower rate of warming in the St. Clair River in 1983 (Fig. 5) may have reduced reproductive success of most species in that year. Smelt, a cold-water spawner, is perhaps less adversely affected by delayed water warming; perhaps as a result, the abundance of larvae of this species was higher in 1983 than in 1984 (Tables 13 and 14). Conversely, the alewife is a late-spawning species, and the large numbers of larvae present in August suggested that the slower water warming rate probably delayed spawning, but did not severely reduce it. In 1984, persistent ice conditions during April resulted in low water temperatures through May, but rapid warming in June was apparently conducive to successful spawning for most species. Alewife spawning probably peaked earlier in 1984 than in 1983, and larvae were most abundant in July.

Hatcher and Nester (1983) also offered evidence that water temperature affected the production of fish larvae in the St. Clair River. Abundance of smelt was higher--and water temperature was lower--in 1978 than in 1977. Alewife and logperch larvae were more abundant and yellow perch larvae were also slightly more abundant during the warmer water conditions in 1977.

In the Detroit River a total of 2,076 fish larvae were collected in 1983 (Table 15). Alewife larvae dominated the catch (33% of the total); other abundant species were gizzard shad (20%), emerald shiner (15%), and white perch (10%). Only a few larval yellow perch and walleyes were taken, indicating that spawning by these species in the Detroit River was limited. In 1984, the 2,800 fish larvae collected in the Detroit River (Table 16) were mostly alewife (28%), gizzard shad (23%), emerald shiner (20%), and white perch (8%). The abundance of yellow perch increased slightly in 1984 from that in 1983, but walleye abundance remained low and unchanged. Improved spawning success in 1984 for some species was suggested by the small increases in the abundance of larvae shown in Tables 15 and 16.

Between year differences in water temperatures and in the abundance of larvae in the Detroit River were not as large as those observed in the St. Clair River during the same general period. Abundance of larvae was highest in June and July in both 1983 and 1984 in the Detroit River (and in 1983 in

Table 13. Number of fish larvae of different species collected in the St. Clair River and its major U.S. tributaries in 1983.

Species	April	May	June	July	August	Total	Percent of total for all species
Alewife	--	--	6	567	703	1,276	62.1
Rainbow smelt	--	310	25	--	--	335	16.3
Unid. darter	--	1	192	20	26	239	11.6
Logperch	--	--	34	17	--	51	2.5
Gizzard shad	--	--	26	6	11	43	2.1
Emerald shiner	--	--	1	8	17	26	1.3
Deepwater sculpin	10	5	--	--	--	15	0.73
Unid. species	--	5	5	5	--	15	0.73
Burbot	--	13	--	1	--	14	0.68
Spottail shiner	--	--	--	--	13	13	0.63
White sucker	--	--	--	8	--	8	0.39
Unid. *Morone* sp.	--	--	3	--	--	3	0.15
Freshwater drum	--	--	1	--	2	3	0.15
White perch	--	--	2	--	--	2	0.1
Unid. Clupeidae	--	--	--	2	--	2	0.1
Unid. Percidae	--	--	--	1	1	2	0.1
Lake herring	--	1	--	--	--	1	0.05
Yellow perch	--	1	--	--	--	1	0.05
Unid. Cyprinidae	--	--	--	1	--	1	0.05
Mottled sculpin	--	--	--	1	--	1	0.05
Brook silverside	--	--	--	--	1	1	0.05
Sea lamprey	--	--	--	--	1	1	0.05
Lepomis sp.	--	--	--	--	1	1	0.05
Etheostoma sp.	--	--	--	--	1	1	0.05
White crappie	--	--	--	--	1	1	0.05
Total	10	336	295	637	778	2,056	

Table 14. Number of fish larvae of different species collected in the St. Clair River and its major U.S. tributaries in 1984.

Species	May	June	July	August	Total	Percent of total for all species
Alewife	--	4	2,605	33	2,642	63.0
Logperch	--	473	85	--	558	13.3
Emerald shiner	--	206	17	83	306	7.3
Rainbow smelt	--	191	10	--	201	4.8
Gizzard shad	--	136	20	22	178	4.3
Unid. darter	--	58	2	7	67	1.6
Freshwater drum	--	52	3	--	55	1.3
Common carp	--	15	25	--	40	1.0
Yellow perch	12	20	3	--	35	0.8
Burbot	31	--	--	--	31	0.7
Spottail shiner	--	2	16	--	18	0.4
White sucker	--	4	14	--	18	0.4
White crappie	--	3	6	--	9	0.2
Deepwater sculpin	8	--	--	--	8	0.2
Johnny darter	--	2	5	--	7	0.2
Unid. species	--	5	1	--	6	0.1
Trout-perch	--	--	6	--	6	0.1
White perch	--	2	1	--	3	0.1
Unid. Clupeidae	--	2	1	--	3	0.1
Unid. Cyprinidae	--	--	1	--	1	< 0.1
Sand shiner	--	--	--	1	1	< 0.1
Mimic shiner	--	--	--	1	1	< 0.1
Rock bass	--	--	--	1	1	< 0.1
Total	51	1,175	2,821	148	4,195	

Table 15. Number of fish larvae of each species collected in the Detroit River and its major U.S. tributary in 1983.

Species	April	May	June	July	August	Total	Percent of total for all species
Alewife	--	--	10	636	28	674	32.5
Gizzard shad	--	--	48	360	5	413	19.9
Emerald shiner	--	--	--	307	10	317	15.3
White perch	--	--	208	4	--	212	10.2
Rainbow smelt	--	77	62	--	--	139	6.7
Unid. Morone sp.	--	--	120	1	--	121	5.8
Unid. darter	--	5	17	18	9	49	2.4
Logperch	--	--	13	16	3	32	1.5
Spottail shiner	--	--	13	1	2	16	0.8
White bass	--	--	12	2	--	14	0.7
Unid. species	--	1	8	3	--	13	0.6
Yellow perch	--	9	3	--	--	12	0.6
Unid. Clupeidae	--	--	--	10	--	10	0.9
Deepwater sculpin	5	4	--	--	--	9	0.4
Common carp	--	--	--	9	--	9	0.4
Unid. Cyprinidae	--	--	5	3	--	8	0.4
Trout-perch	--	--	7	1	--	8	0.4
Walleye	--	3	1	--	--	4	0.2
Burbot	--	1	--	3	--	4	0.2
Lake herring	1	1	--	--	--	2	0.1
Johnny darter	--	--	--	2	--	2	0.1
White sucker	--	--	2	--	--	2	0.1
Spotted sucker	--	--	1	--	--	1	< 0.1
River carpsucker	--	--	1	--	--	1	< 0.1
Slimy sculpin	--	--	1	--	--	1	< 0.1
Freshwater drum	--	--	--	1	--	1	< 0.1
Lake whitefish	1	--	--	--	--	1	< 0.1
Unid. Percidae	--	--	--	--	1	1	< 0.1
Total	7	101	532	1,378	58	2,076	

Table 16. Number of fish larvae of each species collected in the Detroit River and its major U.S. tributary in 1984.

Species	May	June	July	August	Total	Percent of total for all species
Alewife	--	191	591	6	788	28.1
Gizzard shad	--	613	25	--	638	22.8
Emerald shiner	--	103	454	6	563	20.1
White perch	1	197	14	--	212	7.6
White bass	--	110	14	--	124	4.4
Logperch	--	17	97	--	114	4.1
Common carp	--	89	12	--	101	3.6
Yellow perch	78	6	--	--	84	3.0
Rainbow smelt	6	45	9	--	60	2.1
Burbot	19	1	--	--	20	0.7
White crappie	--	20	3	--	20	0.8
Freshwater drum	--	12	5	--	17	0.6
Unid. darter	--	5	2	8	15	0.5
Spottail shiner	--	8	1	--	9	0.3
Unid. Percichthyidae	--	7	--	--	7	0.3
Trout-perch	--	6	--	--	6	0.2
Walleye	6	--	--	--	6	0.2
Unid. species	1	3	1	--	5	0.2
Unid Clupeidae	--	1	3	--	4	0.1
White sucker	--	1	1	--	2	0.1
Unid. Morone sp.	--	--	1	--	1	< 0.1
Deepwater sculpin	1	--	--	--	1	< 0.1
Total	112	1,435	1,233	20	2,800	

the St. Clair River), but peaked in July and August in 1984 in the St. Clair River. The relation between Detroit River water temperatures and relative abundance of fish larvae in 1977 and 1978 (Hatcher and Nester 1983) were similar to those seen in 1983 and 1984. The relatively high abundance of smelt larvae in 1977-1978 was an exception that remains unexplained.

Statistical Analysis of the Distribution of Fish Larvae

Statistical analysis of differences in the density of fish larvae (all taxa combined) in the St. Clair River (Table 17; Appendix 8) was limited to transects I, III, VI, VII, VIII, and IX. Since the mid-channel (M), U.S. shoreline (S1), and Canadian (S) shoreline sampling locations were representative of similar habitats common to all main river transects, we tested densities of larvae at those locations. The number of yolk-sac and non-yolk-sac larvae at each location were summed and the logarithm of this number (N) plus one [log(N+1)] was used in the analyses. When preliminary analyses suggested that densities of fish larvae in the upper St. Clair River (transects I, III, VI) differed from densities in the lower St. Clair River (transects VII, VIII, IX), we performed separate analyses for these two sections of the river.

Densities of larvae differed significantly between years, between months, and among locations in both sections of the St. Clair River (Table 18; Appendix 8). No significant differences in density occurred between transects in the upper section, but one barely significant difference ($P = 0.047$) was noted between transects VII and VIII in the lower St. Clair River.

The interactions of year x month and location x month, which were significant in both sections of the St. Clair River, are of greater importance for understanding the distribution of fish larvae than are the differences between years, months, transects, or locations. Interaction diagrams (Fig. 7) for the upper St. Clair River suggested that densities of larvae increased more rapidly and were higher in June and July in 1984 than in 1983, but were higher in May and August in 1983 then in 1984. One possible reason for these differences could be the differences in water temperature and rate of warming in 1983 and 1984. In 1984, the ice jam and low water temperatures (which persisted through April) probably delayed spawning and caused the density of larvae in May to be low. Rapid warming after May induced high levels of spawning over a relatively short period, resulting in high densities of larvae in June and July, but not in August. In 1983, lower water temperatures and slower warming rates may have produced lower densities of larvae and extended the spawning season, thereby increasing the number of larvae present in August. The location x month interaction (Fig. 7) in the upper St. Clair River indicated that the density of larvae at mid-channel sampling locations was always higher than at the U.S. or Canadian shoreline locations in May and June, and was higher than densities at the U.S. shoreline locations through July and August; however, densities at Canadian shoreline locations exceeded those at mid-channel and along the U.S. shoreline during July and August. Reasons for this shift are unknown.

Table 17. Mean density (number per 1000 m^3 of water) of fish larvae (all species combined) in St. Clair and Detroit rivers and their major U.S. tributaries. (No larvae were taken in September.)

Transect	Station	April	May		June		July		August	
		1983	1983	1984	1983	1984	1983	1984	1983	1984
I	1	7.2	0.0	12.0	49.7	98.1	41.3	676.0	188.6	28.8
	2	6.5	6.8	0.0	21.4	105.2	83.0	919.9	157.3	5.6
	3	0.0	0.0	0.0	8.7	44.7	23.2	678.9	199.4	104.2
II	1	0.0	20.9	0.0	67.4	2926.3	393.9	752.3	69.1	179.4
III	1	7.6	15.8	5.8	17.0	42.1	133.7	323.4	118.7	13.1
	2	6.8	23.8	14.5	145.0	306.8	125.0	798.6	191.7	28.3
	3	0.0	18.9	0.0	7.4	182.4	79.4	1320.0	217.1	7.7
IV	1	0.0	15.6	67.5	125.5	54.1	31.4	572.8	18.7	67.9
V	1	0.0	18.3	148.5	393.9	1655.9	123.4	550.1	117.2	257.2
VI	1	27.0	13.3	18.7	0.0	220.0	67.3	1119.5	42.1	37.3
	2	5.7	4.5	13.6	7.4	200.8	239.2	664.0	139.6	22.6
	3	0.0	97.7	19.1	78.8	169.0	142.7	548.4	135.7	35.4
	4	0.0	32.0	0.0	202.4	270.9	82.9	1178.4	228.1	21.6
	5	0.0	0.0	0.0	0.0	106.1	413.9	7716.4	169.9	33.2
VII	1	0.0	72.5	0.0	0.0	54.7	89.5	492.2	181.3	0.0
	2	15.0	68.8	0.0	95.0	549.4	145.0	570.4	150.0	5.5
	3	0.0	113.7	12.3	286.6	319.9	398.0	522.0	83.4	39.4
	4	0.0	26.7	0.0	42.6	262.9	188.7	778.0	134.0	11.5
	5	0.0	70.2	0.0	0.0	18.6	61.8	880.0	170.9	17.0
VIII	1	0.0	107.8	35.0	17.4	48.1	173.9	236.6	721.1	16.0
	2	6.3	174.6	24.8	56.5	226.5	114.7	475.5	488.7	0.0
	3	0.0	162.3	22.8	39.6	213.5	42.6	561.8	375.1	8.6
	4	0.0	530.5	8.6	59.4	437.6	121.3	507.0	28.7	0.0
	5	0.0	251.6	0.0	0.0	96.6	866.9	1002.1	60.2	49.5
IX	1	0.0	436.9	17.9	0.0	319.7	584.5	89.8	33.7	0.0
	2	0.0	171.1	0.0	233.1	174.6	398.8	430.4	31.7	6.3
	3	5.2	97.8	15.9	77.8	215.7	183.7	445.1	92.9	22.2
	4	0.0	143.7	15.8	42.6	328.8	142.3	461.2	380.4	5.3
	5	0.0	0.0	40.5	37.8	64.2	176.8	642.9	33.4	0.0

Table 17 (Cont'd).

Transect	Station	April 1983	May 1983	May 1984	June 1983	June 1984	July 1983	July 1984	August 1983	August 1984
X	1	0.0	17.4	36.4	24.8	510.0	664.7	639.5	26.6	0.0
	2	8.2	19.0	13.9	24.6	320.7	208.3	483.2	34.7	33.9
	3	6.9	0.0	20.8	115.0	193.3	259.2	153.4	14.3	0.0
	4	15.4	0.0	61.6	33.9	654.4	344.7	438.3	0.0	0.0
XI	1	0.0	14.6	49.5	44.7	657.9	2292.3	593.5	43.8	0.0
	2	12.8	0.0	26.0	14.7	221.3	183.8	452.8	11.5	11.7
	3	0.0	10.7	82.5	101.3	361.2	135.1	248.4	12.8	0.0
XII	1	7.1	62.9	7.1	133.1	501.6	1393.8	1425.5	0.0	5.6
XIII	1	0.0	0.0	28.3	50.4	144.4	263.6	213.6	4.8	0.0
	2	0.0	15.0	26.0	5.3	593.0	427.6	814.3	10.6	0.0
	3	0.0	9.8	38.5	52.9	220.7	143.3	56.8	0.0	10.4
	4	0.0	0.0	66.9	499.7	480.4	147.8	301.3	5.8	18.3
XIV	1	0.0	157.3	35.5	355.5	353.9	813.3	668.9	67.8	33.3
	2	0.0	64.3	28.7	294.2	501.4	818.2	491.9	52.9	0.0
	3	0.0	41.0	65.2	274.9	278.4	413.4	71.4	55.1	6.2
	4	0.0	0.0	44.2	189.4	308.1	305.5	126.7	7.0	0.0
	5	0.0	17.2	144.6	495.0	225.7	808.6	549.8	47.4	0.0
XV	1	0.0	11.9	38.5	2095.0	1209.0	1286.5	783.8	0.0	0.0
	2	0.0	291.8	0.0	485.7	948.1	700.7	475.6	11.0	12.0
	3	0.0	261.8	0.0	166.0	3162.1	911.9	462.1	61.0	0.0
	4	0.0	212.2	23.0	0.0	3018.6	536.9	227.2	34.0	45.1
	5	30.2	146.9	211.4	188.8	1497.8	868.9	1486.2	130.5	34.0

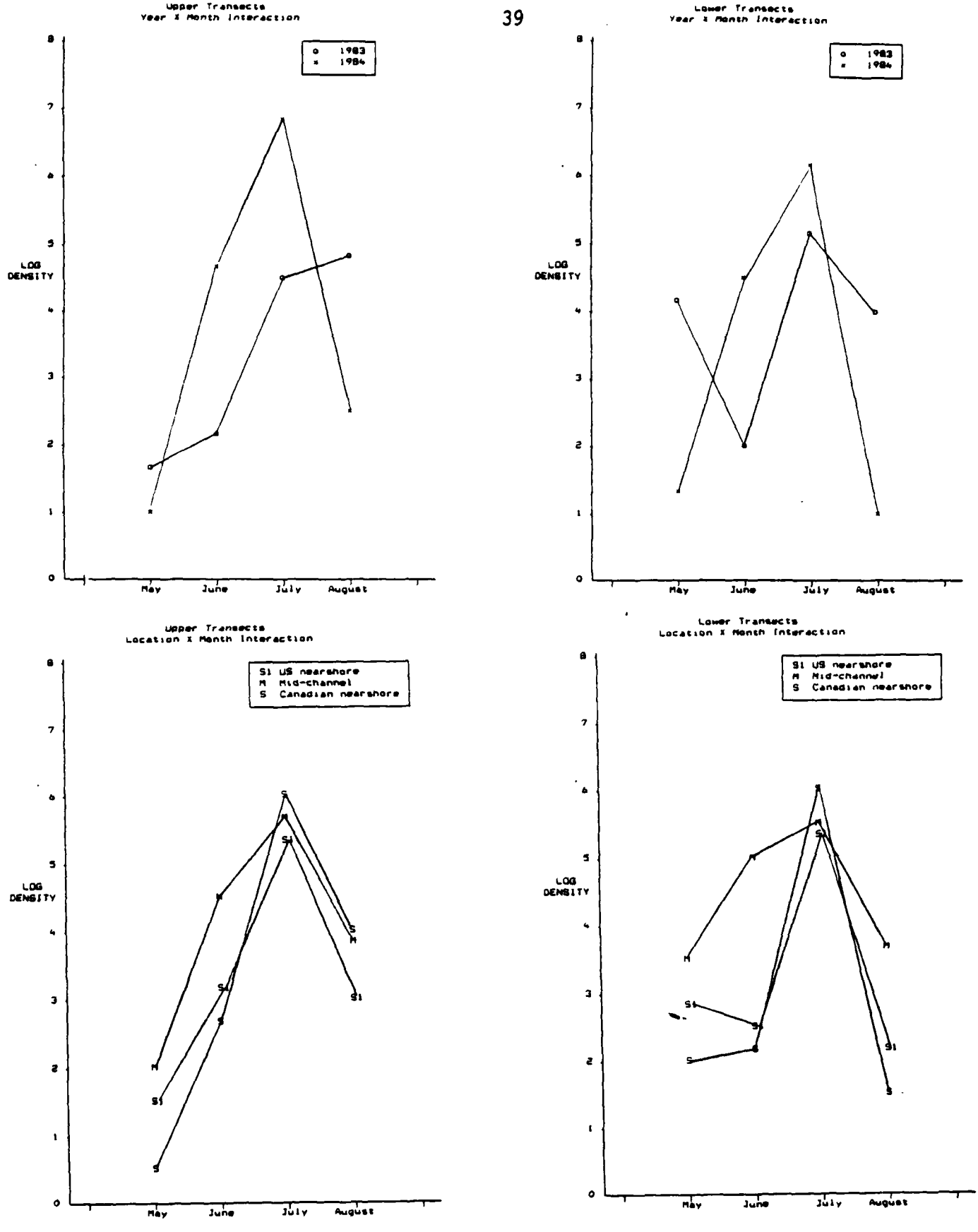

Fig. 7. Interaction diagrams showing trends in ANOVA means for densities of fish larvae (all species combined) in the St. Clair River. Transects I, III, and VI are in the upper river and VI-IX in the lower river.

Fish larvae were distributed somewhat differently in the lower than in the upper St. Clair River (Fig. 7). In 1984 the same general trend of rapidly increasing density during June and July, followed by an abrupt decrease in August, occurred in both the lower and upper river. In 1983 however, the high density in May in the lower river, followed by a decline in density in June was markedly different from the trend observed in the upper river. The subsequent increase in density from June through July, and the relatively high density in August 1983, were generally similar to the trends in the upper river. The location x month interaction (Fig. 7) in the lower St. Clair River indicated that in May and June the densities were higher at mid-channel than along either shoreline. Densities of larvae were higher along the Canadian shoreline, intermediate at mid-channel, and lower along the U.S. shoreline in July. These trends in the lower river were generally similar to those in the upper river in May to July. In August, however, the distribution of larvae in the lower river differed from that in the upper river. Densities were highest at mid-channel, intermediate along the U.S. shoreline, and lowest along the Canadian shoreline. Reasons for the differences in August cannot be determined from the available data.

Analysis of the density of fish larvae (all taxa combined) in the Detroit River was restricted to mid-channel locations, U.S. off-channel locations (E1), and Canadian off-channel locations (E). Nearshore locations on both the U.S. and Canadian sides of the Detroit River at most transects were not shallow littoral zones as they were in the St. Clair River and, we believed that analysis of the density of larvae at off-channel locations would be more comparable to and representative of the overall Detroit River habitat. Data from transects X, XI, XIII, and XIV were used in the analysis; transect XV was excluded because it was more representative of Lake Erie than of the Detroit River.

Preliminary analysis of all data combined from both years of sampling indicated that about 65% of the variation in the density of larvae could be explained by year-to-year and month-to-month differences. In general, densities were higher in May and June in 1984, but tended to be higher in July and August in 1983. Further analysis was done separately for each year because of the significant high-order interactions.

In 1983, differences in the density of larvae between transects, between sampling locations, and between months were all significant (Table 18; Appendix 8). Mean densities were highest at transect XIV and successively lower at transects XI, X, and XIII. Tukey's Test indicated that density was significantly higher at transect XIV (but not at XI) than at transects X and XIII. Densities at off-channel locations were significantly higher on the U.S. side of the river than on the Canadian side; densities at mid-channel locations were intermediate and no significantly different from those at either U.S. or Canadian off-channel locations. Densities were highest in July, followed in order by June, August, and May; densities in August and May were not significantly different.

Strong interaction, including location effects, precluded a simple

Table 18. Mean density of alewife larvae (number per 1000 m^3 of water) in the St. Clair and Detroit rivers and their major U.S. tributaries.

Transect	Station	June		July		August	
		1983	1984	1983	1984	1983	1984
I	1	0.0	0.0	35.6	592.3	177.8	57.5
	2	0.0	0.0	47.8	749.1	138.6	0.0
	3	0.0	0.0	23.3	633.5	199.4	60.7
II	1	0.0	18.6	306.4	421.7	51.6	0.0
III	1	11.4	0.0	128.0	317.4	83.4	26.1
	2	0.0	0.0	101.2	693.3	168.4	17.1
	3	0.0	0.0	79.4	973.2	174.8	15.3
IV	1	69.3	0.0	31.4	434.0	37.3	0.0
V	1	33.4	0.0	215.9	427.9	66.0	47.4
VI	1	0.0	0.0	71.7	842.0	0.0	74.6
	2	0.0	0.0	193.4	464.1	118.0	0.0
	3	0.0	0.0	126.3	523.8	113.0	8.7
	4	0.0	0.0	82.9	893.0	228.1	28.9
	5	0.0	0.0	378.9	5016.9	110.2	0.0
VII	1	0.0	0.0	89.5	451.6	362.5	0.0
	2	0.0	0.0	111.6	523.9	133.3	11.1
	3	0.0	0.0	326.2	446.8	59.1	20.1
	4	0.0	25.6	171.2	722.0	111.7	11.5
	5	0.0	0.0	61.8	836.5	273.5	0.0
VIII	1	0.0	0.0	167.3	236.6	701.0	32.0
	2	0.0	0.0	104.8	464.0	470.6	0.0
	3	0.0	0.0	31.5	530.9	367.5	8.3
	4	0.0	0.0	111.4	462.6	28.7	0.0
	5	0.0	0.0	866.9	914.2	38.0	0.0
IX	1	0.0	0.0	584.5	89.8	0.0	0.0
	2	0.0	0.0	365.7	320.5	15.7	0.0
	3	0.0	0.0	173.3	429.4	77.3	8.9
	4	0.0	0.0	117.3	404.3	354.8	0.0
	5	75.7	0.0	135.1	624.2	66.8	0.0

Table 18 (Cont'd).

Transect	Station	June		July		August	
		1983	1984	1983	1984	1983	1984
X	1	0.0	150.9	310.3	211.1	1/.8	0.0
	2	0.0	147.5	57.9	265.1	23.0	22.2
	3	0.0	56.1	115.1	72.8	28.7	0.0
	4	0.0	92.7	124.1	65.9	0.0	0.0
XI	1	19.5	194.0	1146.1	173.8	35.3	0.0
	2	0.0	48.7	41.0	345.9	11.5	0.0
	3	0.0	36.5	88.3	70.8	12.8	0.0
XII	1	14.3	87.6	651.1	395.1	0.0	0.0
XIII	1	9.7	32.6	106.4	65.2	0.0	0.0
	2	0.0	128.3	207.7	449.3	10.6	0.0
	3	0.0	46.2	66.1	21.3	0.0	0.0
	4	0.0	22.8	55.0	51.5	0.0	18.3
XIV	1	0.0	33.8	358.2	429.4	0.0	0.0
	2	0.0	84.7	354.5	290.9	34.8	0.0
	3	13.4	37.4	285.7	13.3	22.6	0.0
	4	19.3	112.9	209.2	48.4	0.0	0.0
	5	34.3	288.6	665.2	346.7	0.0	0.0
XV	1	22.4	172.6	419.4	436.2	0.0	0.0
	2	0.0	51.8	212.1	293.1	22.0	24.0
	3	0.0	243.1	376.1	265.7	45.3	0.0
	4	0.0	58.2	132.4	120.8	22.3	0.0
	5	125.0	130.1	452.0	1254.6	130.5	67.9

description of trends in the density of larvae in the Detroit River in 1984 (Appendix 8). In general, density peaked in June or July and declined sharply in August. Different locations had high densities in different months, depending on transect, and no explanation for the variability was readily apparent. Overall, transect-to-transect differences may not be important. Interaction diagrams (Fig. 8) help to illustrate some of the complex relations. For example, density in May at mid-channel locations was intermediate, lower, lower, and higher than at off-channel locations at transects X, XI, XIII, and XIV, respectively, on both U.S. and Canadian sides of the river; however in June the density at mid-channel, with respect to that of other locations, was lower, lower, higher, and intermediate. The density relation between off-channel locations also changed between transects. Similar differences occurred at other locations and collectively prevented us from identifying consistent temporal or spatial trends that were representative of the entire Detroit River.

Only alewife larvae were collected in adequate numbers in each river to allow us to statistically analyze the distribution of an individual species (Table 18; Appendix 9). In the St. Clair River, enough alewife larvae were present along transects I, III, VI, VII, VIII, and IX in July and August to permit statistical treatment. Because preliminary analysis indicated that alewife densities at transect I were distinctly different from those at the other five transects, we considered data for transect I separately from the combined data for the other five transects. The effects of year and month on alewife density in the St. Clair River were dominant. The three two-way interactions involving month effects at all transects (excluding transect I) were also significant (Fig. 9). In general, densities were higher in July than in August, and more alewife larvae were present in 1983 (when higher densities were sustained through August) than in 1984 (when density declined sharply from July to August). Although alewife densities in July were highest at Canadian shoreline locations, there was little variation from location to location except in August, when densities at shoreline locations were significantly lower than those at mid-channel. Densities at transect I increased from July to August in 1983 and densities were highest at the Canadian shoreline location and lowest at mid-channel (Fig. 10). Trends in alewife density by month in 1984 were the opposite of those observed at the other transects, suggesting that alewife density at transect I may have more accurately reflected conditions in Lake Huron than in the St. Clair River proper.

Sufficient alewife larvae were captured in the Detroit River on transects X, XI, XIII, and XIV in June, July, and August each year to allow us to analyze their density for these months. Year and month effects accounted for most of the variability. Location was also a significant factor but densities did not vary significantly among transects. Tukey's Test showed that densities at off-channel locations tended to be higher on the U.S. side than on the Canadian side, whereas densities at mid-channel locations were intermediate and not significantly different from those of off-channel locations. The year x month interaction effects on alewife densities (Fig. 11) showed that densities

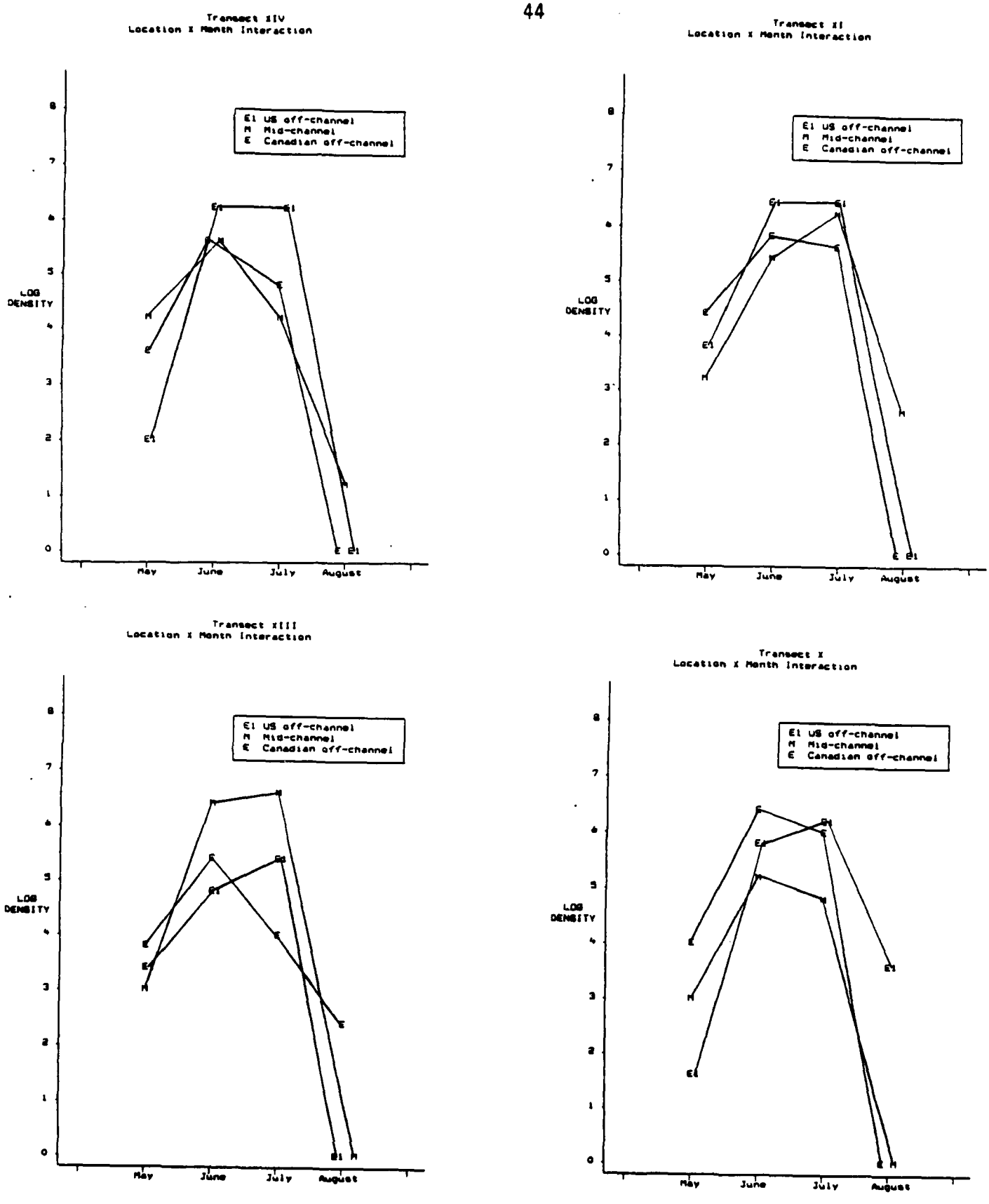

Fig. 8. Interaction diagrams showing trends in ANOVA means for densities of fish larvae (all species combined) on transects X, XI, XIII, and XIV in the Detroit River.

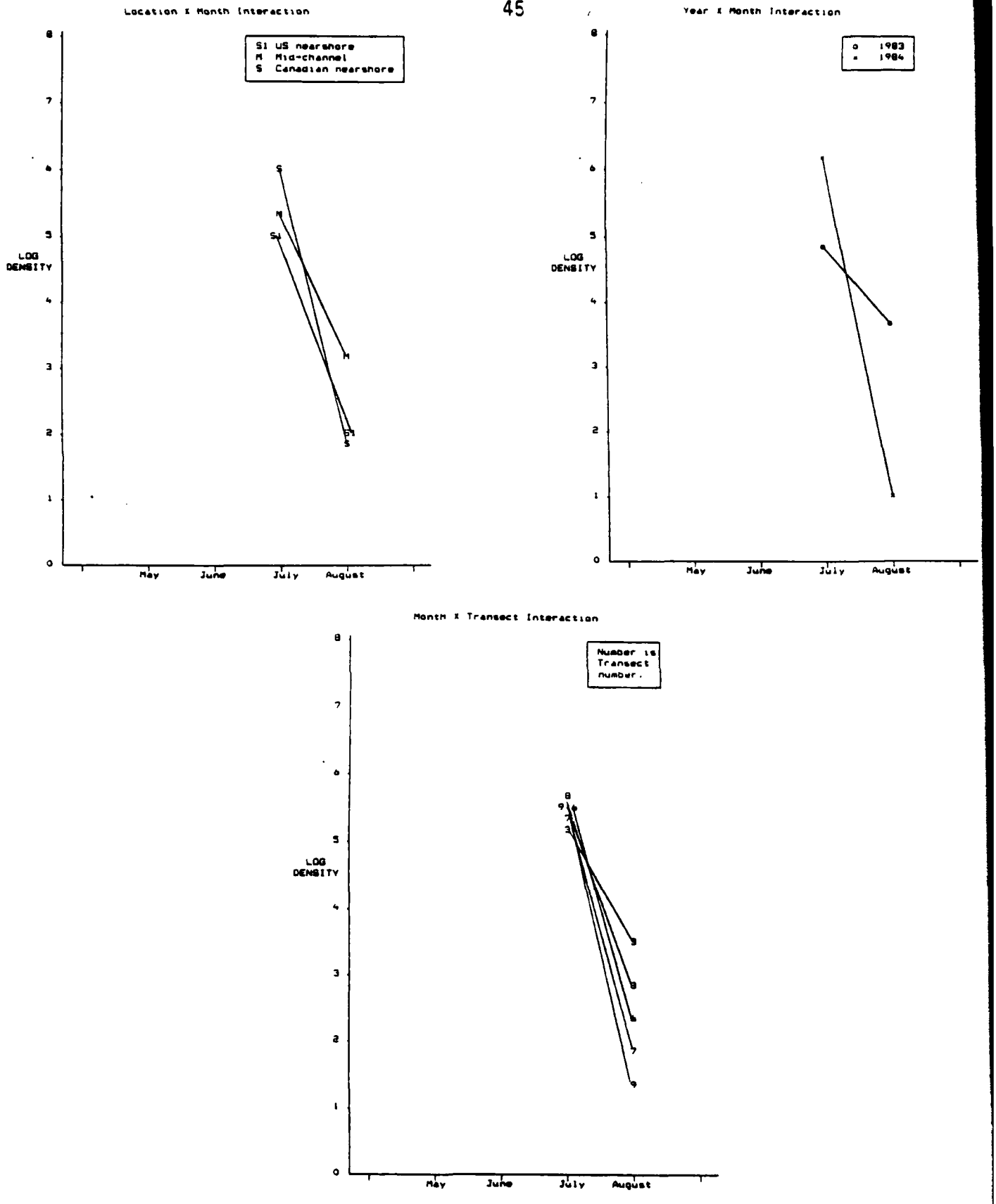

Fig. 9. Interaction diagrams showing trends in ANOVA means for densities of alewife larvae on transects III, and VI-IX in the St. Clair River.

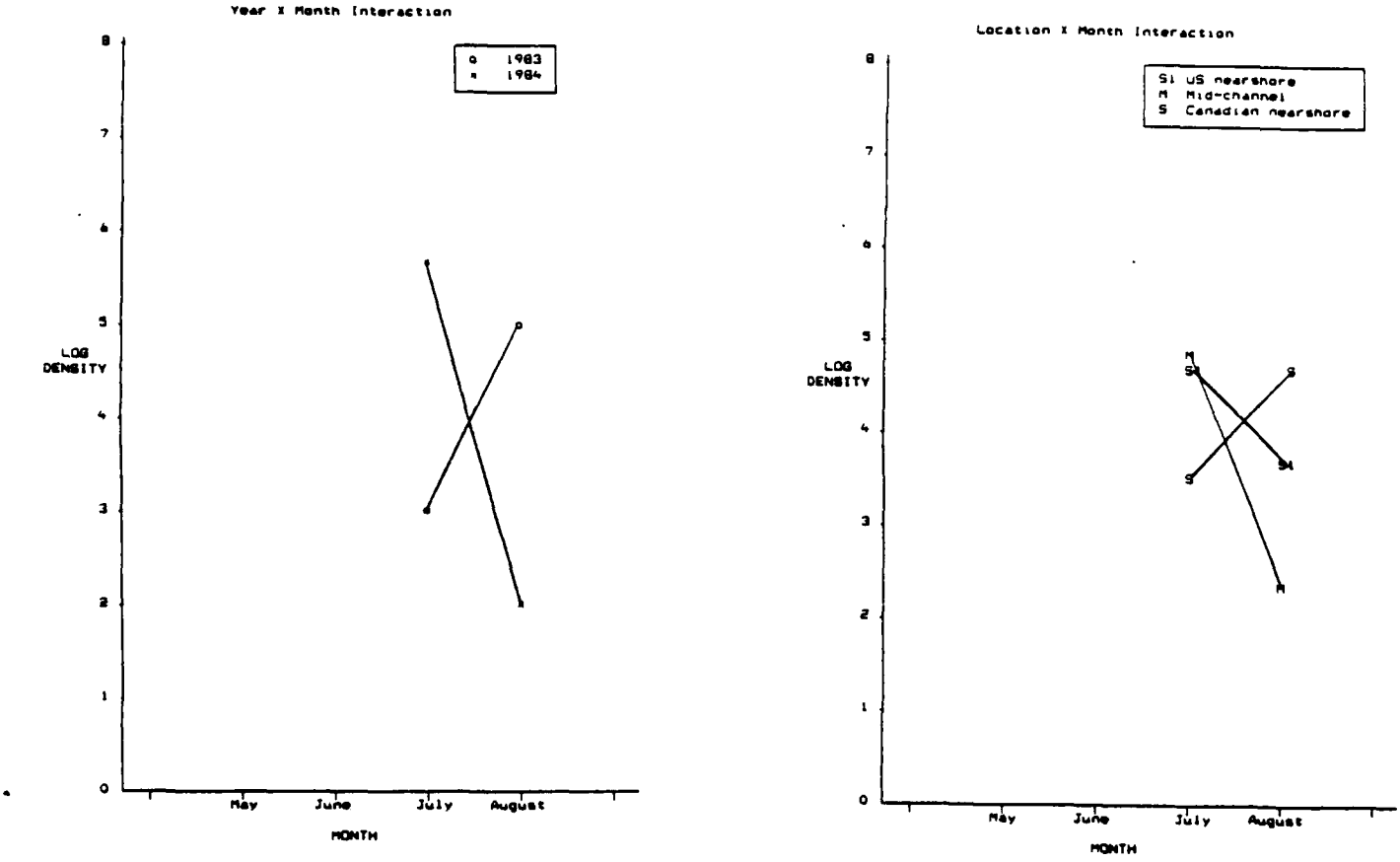

Fig. 10. Interaction diagrams showing trends in ANOVA means for densities of alewife larvae on transect I in the St. Clair River.

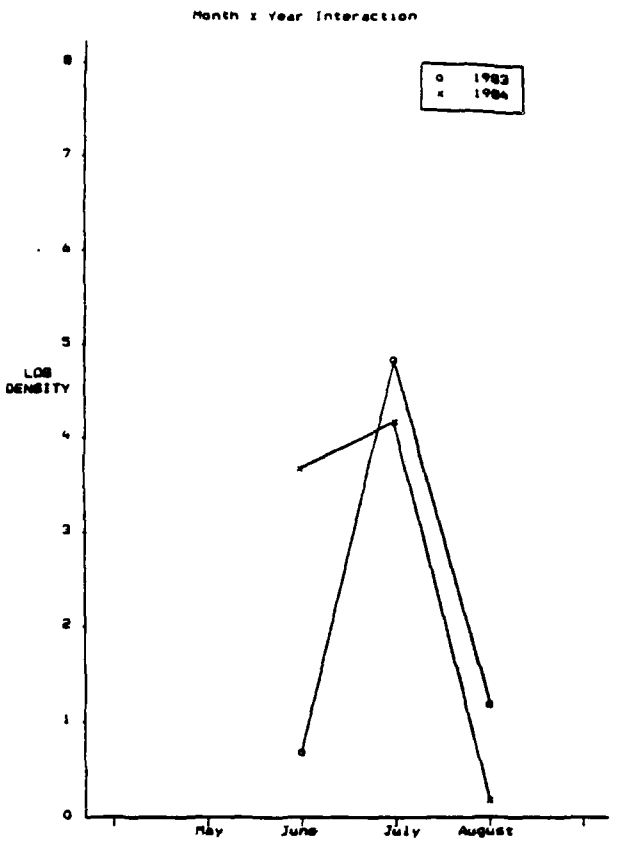

Fig. 11. Interaction diagrams showing trends in ANOVA means for densities of alewife larvae on transects X, XI, XIII, and XIV in the Detroit River.

in 1983 were low in June, increased rapidly to peak levels in July, and then declined sharply in August. Density was high in June 1984, probably because spawning was earlier than in 1983. It increased only slightly in July and then declined sharply in August to lower levels than had occurred during the previous year, when spawning may have been delayed by lower water temperatures.

Attempts to correlate density of larvae (all taxa combined) with fishing depth or with surface water temperature were relatively unsuccessful (Table 19). In the St. Clair River in 1983, correlations with fishing depth (0-46 ft) were significant in July and August. Density of larvae varied inversely with depth in July and directly with depth in August. In 1983, the only significant correlation with water temperature in the St. Clair River occurred in June. Temperatures varied from 49 to 72°F among sampling locations, and density was higher at stations where the water was warmer. In the St. Clair River in 1984,
density was positively correlated with water temperatures in May and June (when water temperatures were 44 - 58°F), but was not significantly correlated with fishing depth.

Temperatures in the Detroit River tend to be several degrees higher than the St. Clair River during spring and summer, and the relationship between density of larvae and water temperature or fishing depth in the two rivers also differs. In the Detroit River, density of larvae was significantly correlated with water temperatures only in June and July 1983, when water temperatures were 57 - 72°F; it was negatively correlated with fishing depth during July and August 1983. In 1984, the correlation between density and water temperature in the Detroit River was again significant only in June and July. Correlations between density and fishing depth were negative in June and July in 1984.

This statistical analysis of distribution of fish larvae in SCDRS focused on the St. Clair and Detroit rivers because changes in shipping activities directly affect these areas. However, production of fish larvae in Lake St. Clair, Lake Huron, and the major U.S. tributaries to SCDRS may also be important, because these larvae move into the St. Clair and Detroit rivers, where they become vulnerable to any potentially adverse effects associated with shipping. Although the mean density of larvae varied widely among the segments of SCDRS and between years, densities were lower at the head of the St. Clair and Detroit rivers and higher in the tributaries than in the rivers proper (Table 20). Thus it appears that Lakes Huron and St. Clair may contribute large numbers of larvae to SCDRS, and that considerable production may also occur in the St. Clair and Detroit rivers and their tributaries. A more rigorous evaluation of the relative contributions of larvae by each segment of SCDRS is needed to adequately assess the potential effects of extended navigation on the SCDRS, but such an evaluation will require the development and use of a hydrodynamic model--a task that was beyond the scope of the present study.

CONCLUSIONS

The data on fish egg and larvae collected in SCDRS during 1983 and 1984

Table 19. Coefficients of correlation between the density of fish larvae (all taxa combined) and fishing depth or water temperature.[a/]

Factor	1983					1984			
	April	May	June	July	Aug	May	June	July	Aug
				St. Clair River					
Fishing depth	NS	NS	NS	-0.266	0.311	NS	NS	NS	NS
Water temperature	NS	NS	0.394	NS	NS	0.375	0.680	NS	NS
				Detroit River					
Fishing depth	NS	-0.516	NS	-0.340	-0.430	NS	-0.497	-0.324	NS
Water temperature	NS	NS	0.419	0.423	NS	NS	0.334	0.469	NS

[a/] NS = Not significant. P = > 0.05.

Table 20. Mean density of fish larvae (number of fish larvae all species combined per 1000 m^3 of water) in the SCDRS. Values are based on data in Table 17.

Location	1983	1984	1983-1984
Head of St. Clair River (transect I)	53	223	128
St. Clair River proper (transects III, and VI - IX)	116	296	243
St. Clair River tributaries (transects II, IV, and V)	178	603	360
Head of Detroit River (transect X)	91	223	149
Detroit River proper (transects XI, and XIII - XV)	214	335	272
Detroit River tributary (transect XII)	319	485	393

are useful for assessing the importance of this area as a spawning and nursery area. Differences in water temperatures and ice conditions in spring in 1983 and 1984, probably affected spawning success of many species. The distribution and abundance of fish eggs and larvae differed markedly between the two years, and appeared to be greater in the St. Clair River, where water temperatures were inversely correlated with the abundance of fish eggs and larvae in 1983, and where monthly water temperatures in spring and summer are normally lower than in the Detroit River. Although severe ice conditions in the St. Clair River persisted during April 1984, rapid warming in May and June was associated with higher densities of eggs and larvae in both rivers, the larger increase occurring in the St. Clair River.

Analyzing the importance of SCDRS as a spawning and nursery area is particularly difficult because of the multi-species fish community that occurs there. Changing environmental factors may favor the spawning of some species and adversely affect that of others. Comparisons of spawning and nursery areas between locations within or between rivers during any month or between years are necessarily descriptive because the 2-year data base from this study is generally inadequate for quantitative analyses of most comparisons that would be of interest.

Our fish egg collections show that at least 19 species spawned in SCDRS. These collections also suggested that in years when adverse spawning conditions prevailed, only the more suitable sites tended to be used, whereas in years with more favorable spawning conditions all available spawning habitat seemed to be used.

The density of fish larvae differed markedly between years and especially between months. The usually higher densities in the Detroit River after May could be attributed to three possible causes: First, species that prefer lower water temperatures for spawning, such as smelt, spawn earlier in the St. Clair River, and are the prevalent species in this river. Second, more species spawn in the Detroit River, as evidenced by the higher diversity of larvae there and third, larvae drifting downstream from Lake St. Clair and the St. Clair River may contribute to the higher diversity and density of larvae observed in the Detroit River. Whatever the cause, the densities of fish larvae that we measured suggested that the Detroit River was probably more important than the St. Clair River as a nursery area in June and July.

Low densities of yellow perch and walleye eggs and larvae in the St. Clair River probably indicated that these species did not spawn heavily in the river in 1983-1984, and that eggs and larvae produced in Lake Huron did not enter the St. Clair River in large numbers. Although densities of eggs and larvae of these species were slightly higher in the Detroit River, it also probably did not serve as a major spawning or nursery area in 1983-1984. Walleye and yellow perch larvae found in the St. Clair and Detroit rivers may have been spawned in tributaries or in Lake St. Clair. Thus the St. Clair and Detroit rivers are probably more important as migration routes for adults and immature fish than as spawning areas for these species.

Potential impacts on fish spawning in SCDRS associated with the proposed extension of winter navigation could result from two possible alterations of the habitat. First, the spawning sites could be eroded by ice accumulation, movement, and scouring that resulted from increased vessel movement through the waterway: such alterations could reduce available spawning habitat and decrease spawning success of some species. Second, extended navigation could alter the water temperatures of SCDRS by facilitating or delaying ice breakup or jams. Either positive or negative impacts on fish spawning could result, depending on the species of fish and whether water temperatures were increased or decreased, and warming rates were advanced or delayed.

Because only three species found during this study typically spawn during fall or winter, it seems highly unlikely that shipping and ice movement associated with extended navigation would destroy significant numbers of fish eggs or recently hatched larvae in SCDRS. Larvae of lake whitefish and lake herring, which spawn in November, and burbot, which spawn in November-March, were present in our samples in April and May 1983, but none were abundant, suggesting that SCDRS may not be an important spawning or nursery area for these species.

In summary, the use of SCDRS by a variety of fish species as a spawning and nursery area differed in 1983 and 1984. Changing water temperatures and ice conditions probably contributed to this difference. The effect of extended lock operations to January 31 ± 2 weeks on fish reproduction is uncertain. Only three species spawn immediately before or during the period covered by the proposed extension, the others spawn in spring or summer. Spawning activities and the deposited eggs of fall and winter spawners could be affected directly by season extension, whereas the impact on spring and summer spawners would be indirect, through physical modification of spawning grounds or modification of the thermal regime. Results from this study cannot be used to demonstrate impact, but will serve as baseline data to identify existing fish spawning and nursery conditions under current vessel traffic levels in SCDRS. If extended lock operations result in increased vessel traffic in the future, the study data can be used to help determine if fish reproductive success in SCDRS is being altered by this change in shipping practice.

ACKNOWLEDGMENTS

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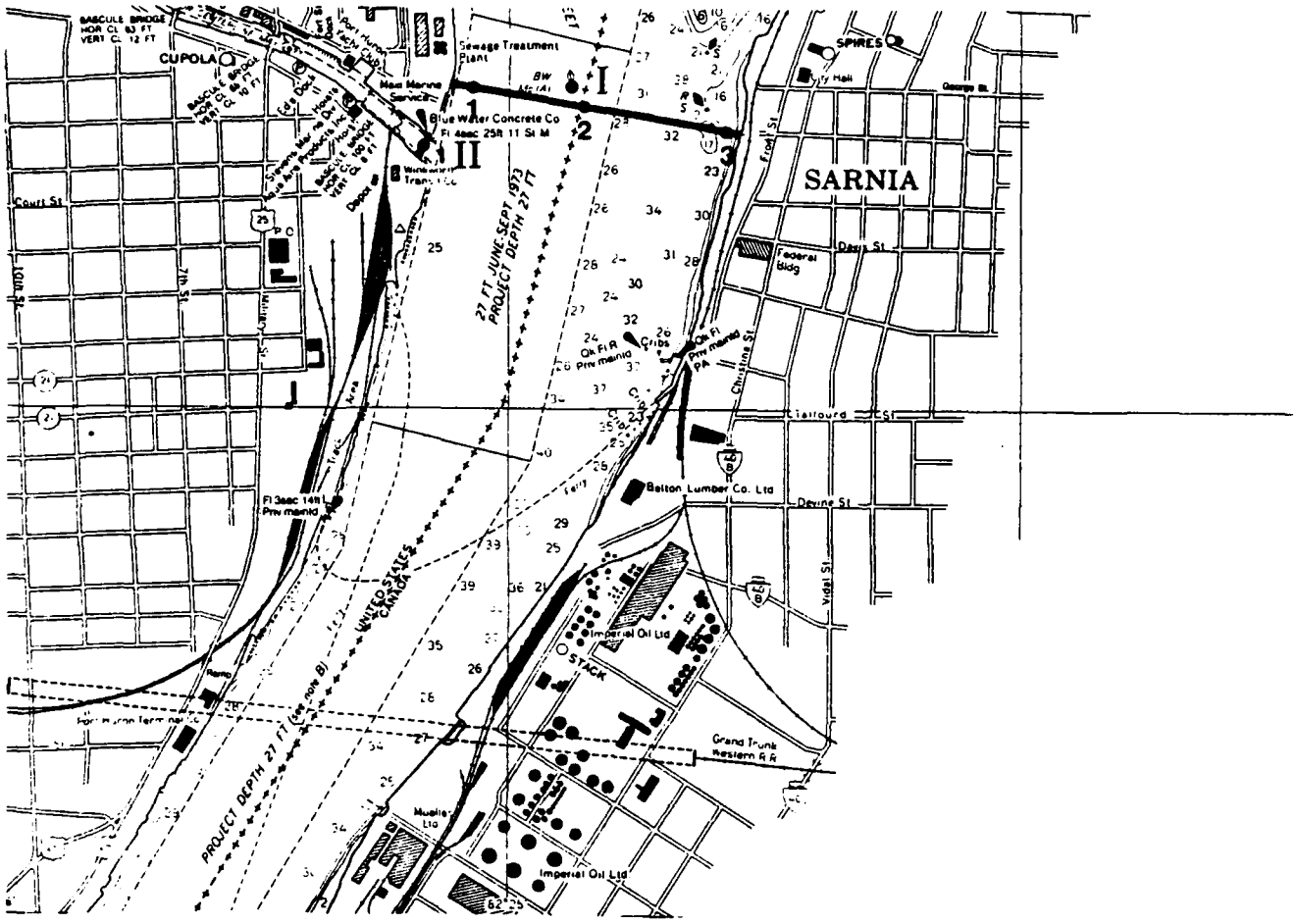
APPENDIX 1. Sampling locations for fish eggs.



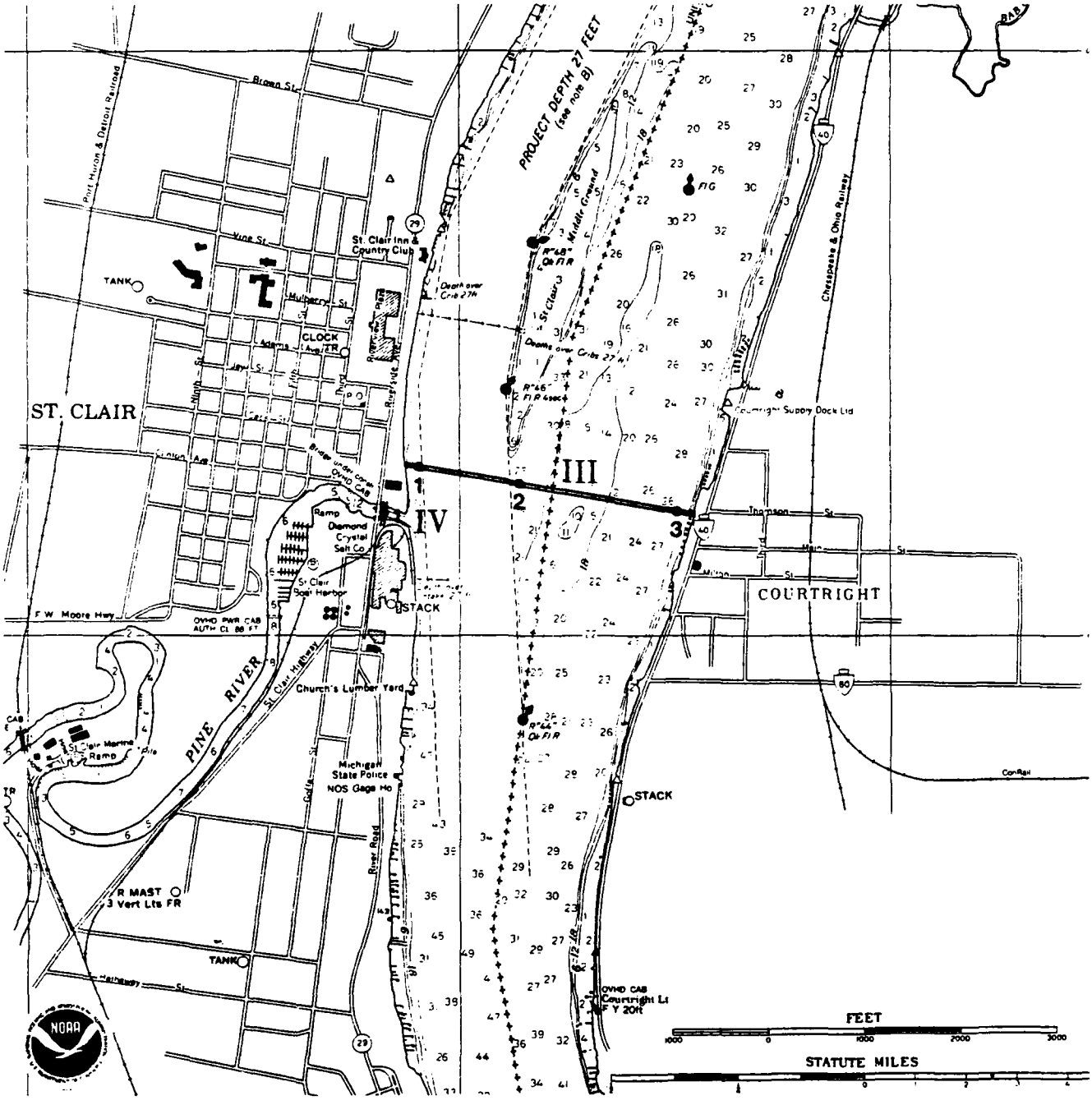
Transect I was located at Port Huron at the head of the St. Clair-Detroit River System just above the mouth of the Black River. Station 1 was on the U.S. side of the river adjacent to the Port Huron Sewage Treatment Plant about 100 m offshore; station 2 was in mid-channel immediately adjacent to the mid-channel marker, about 400 m from either shore; and station 3 was on the Canadian side about 150 m offshore. Water depth at stations 1, 2, and 3 respectively, was 10.4, 10.1, and 6.4 m.

Transect II was located in the Black River. Station 1 was about 40 m upstream from the mouth, at a depth of 6.1 m.

ST. CLAIR RIVER

TRANS I & II

Fig. 1



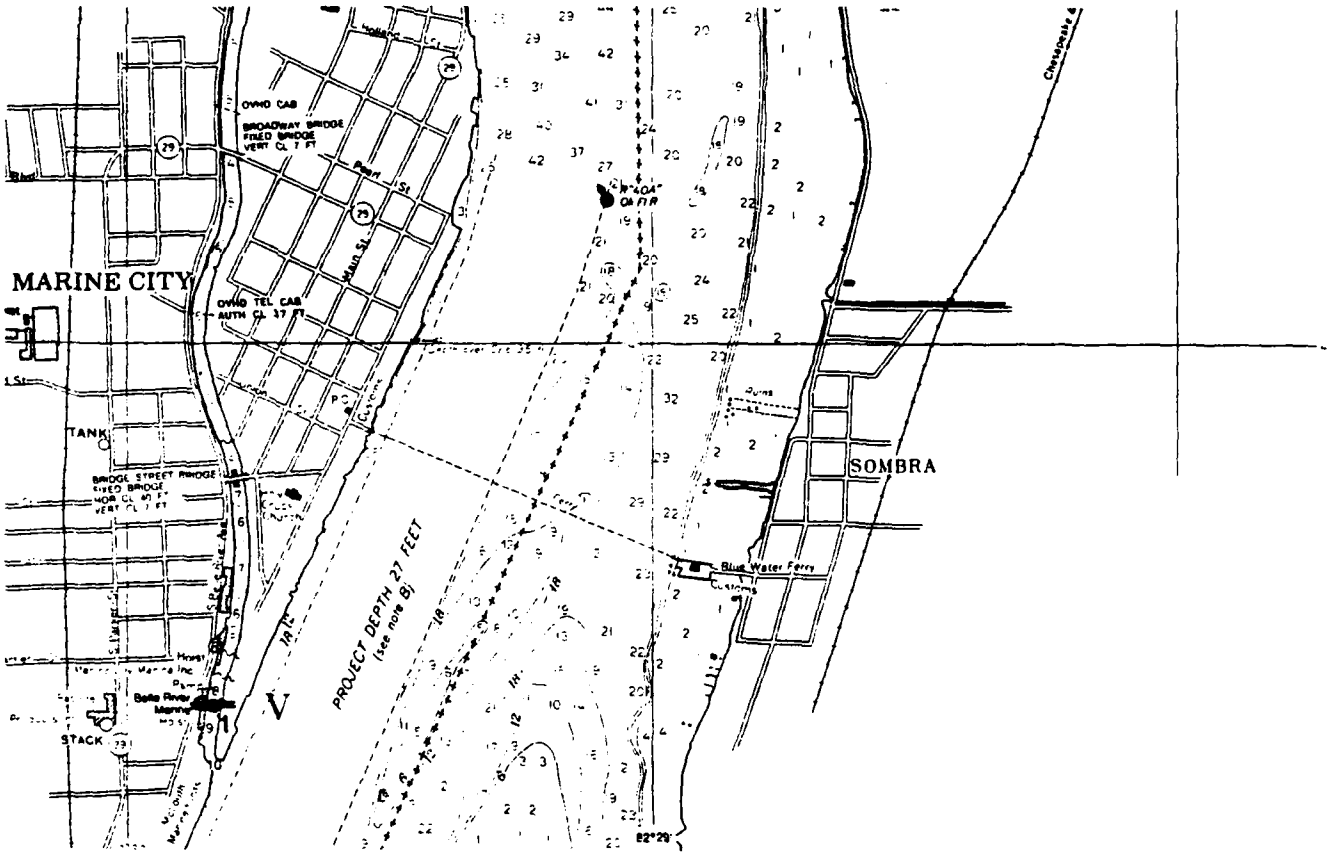
Transect III was located at St. Clair about 200 m north of the mouth of the Pine River. Station 1 was on the U.S. shore about 70 m offshore; station 2 was in mid-channel just south of the St. Clair Middle Ground about 360 m from the U.S. shore; station 3 was on the Canadian side about 50 m offshore near the intersection of Thompson Street and Rt. 40. Water depth at stations 1, 2, and 3, respectively, was 10.7, 11.0, and 8.5 m.

Transect IV was located in St. Clair at the mouth of the Pine River, under the Rt. 29 bridge. Water depth at station 1 was about 4.6 m.

ST. CLAIR RIVER

TRANS III & IV

Fig. 2

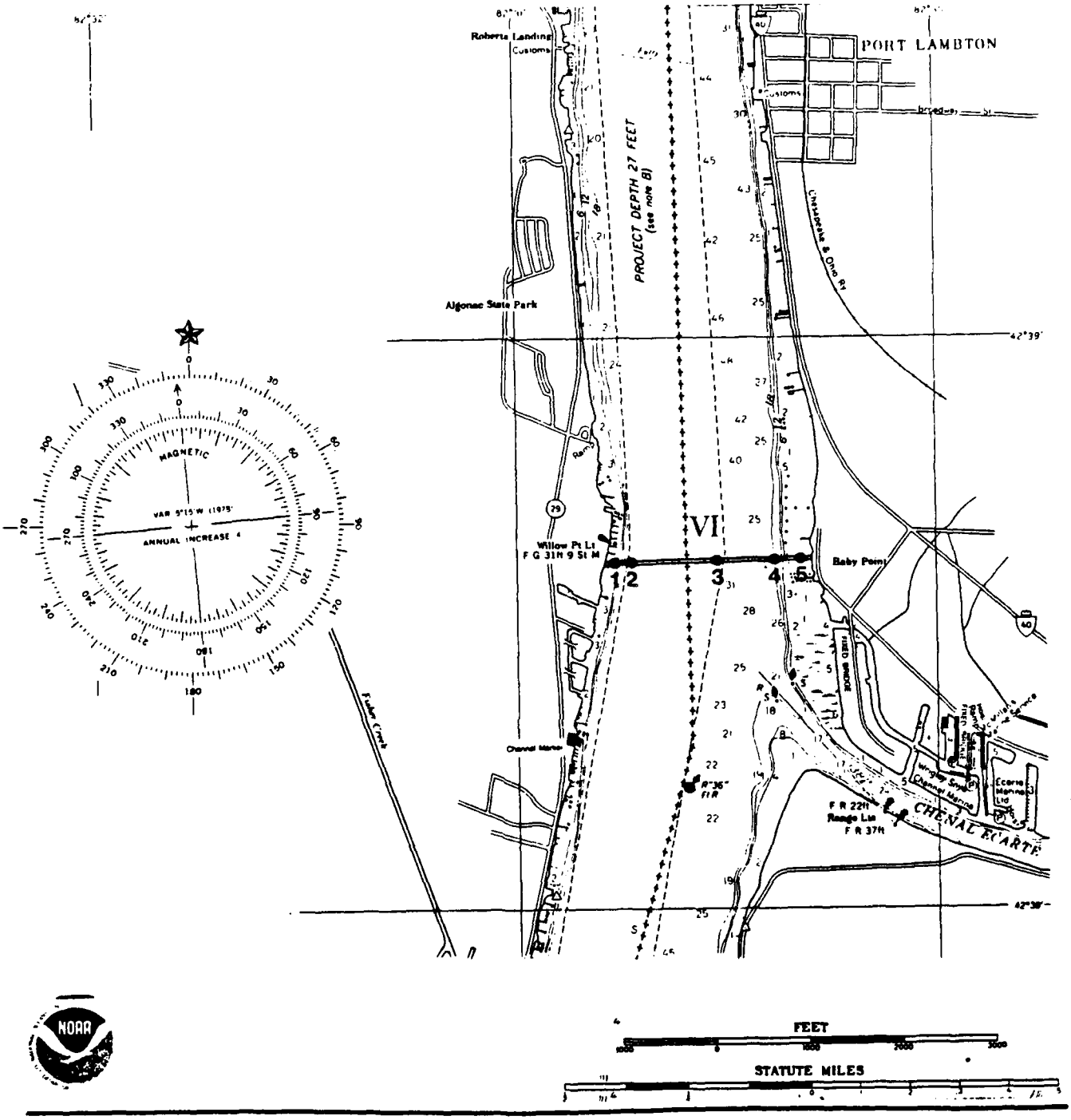


Transect V was located in Marine City at the mouth of the Belle River adjacent to Belle River Marine. Water depth at station 1 was 3 m.

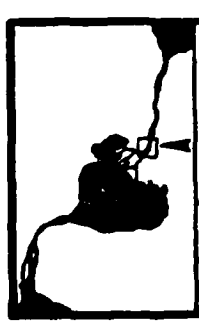
ST. CLAIR RIVER

TRANSECT V

Fig. 3



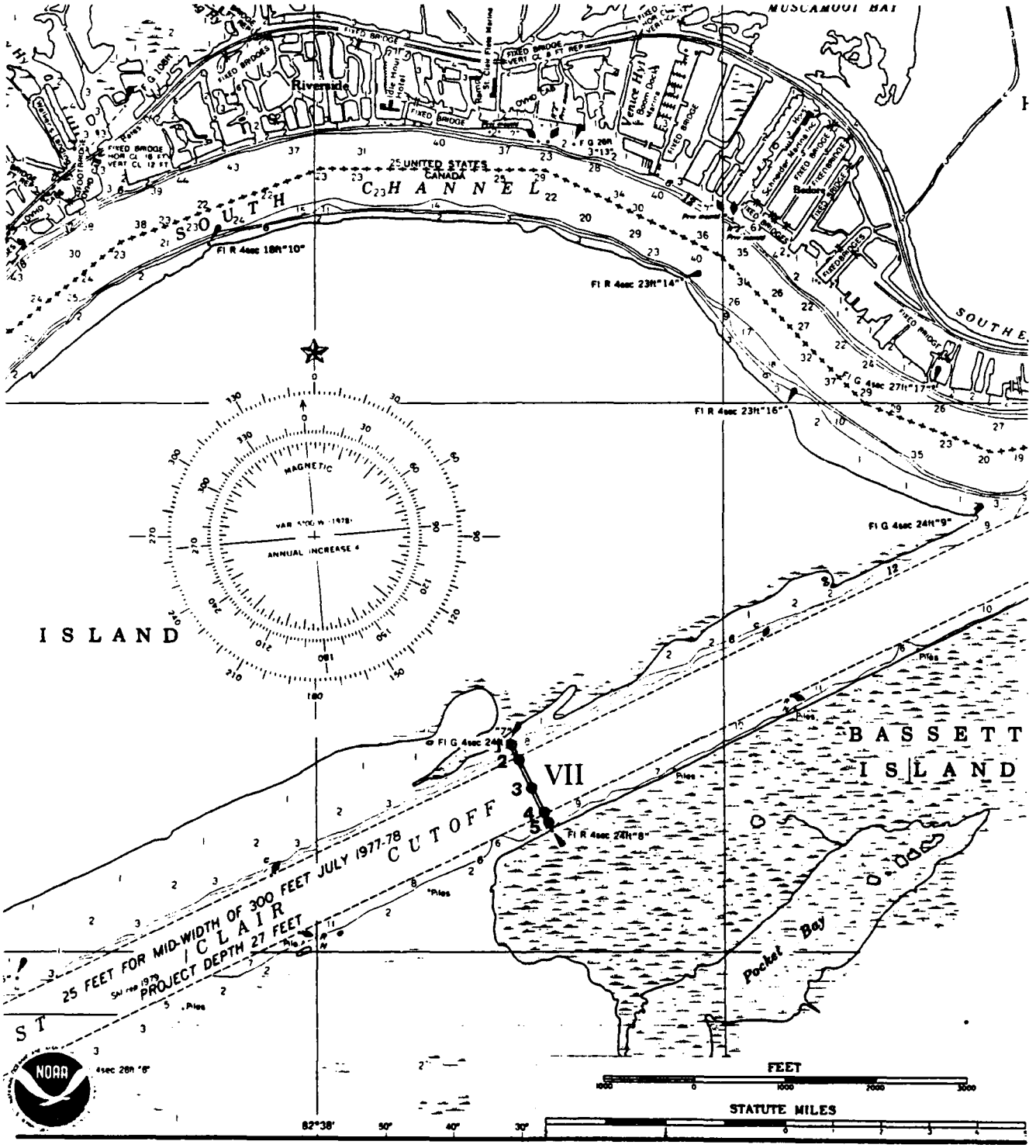
Transect VI was located about 36 km downstream of transect I near the head of Chenal Ecarte. Station 1 was on the U.S. side of the river adjacent to the Willow Point Light about 20 m offshore; station 2 was about 50 m offshore; station 3 was in mid-channel, about 350 m from either shore; station 4 was located on the Canadian side, about 150 m offshore, and station 5 was on the Canadian side about 40 m offshore. Water depth at stations 1, 2, 3, 4, and 5 respectively, was 3.4, 12.2, 13.1, 8.5, and 1.2 m.



ST. CLAIR RIVER

TRANSECT VI

Fig. 4

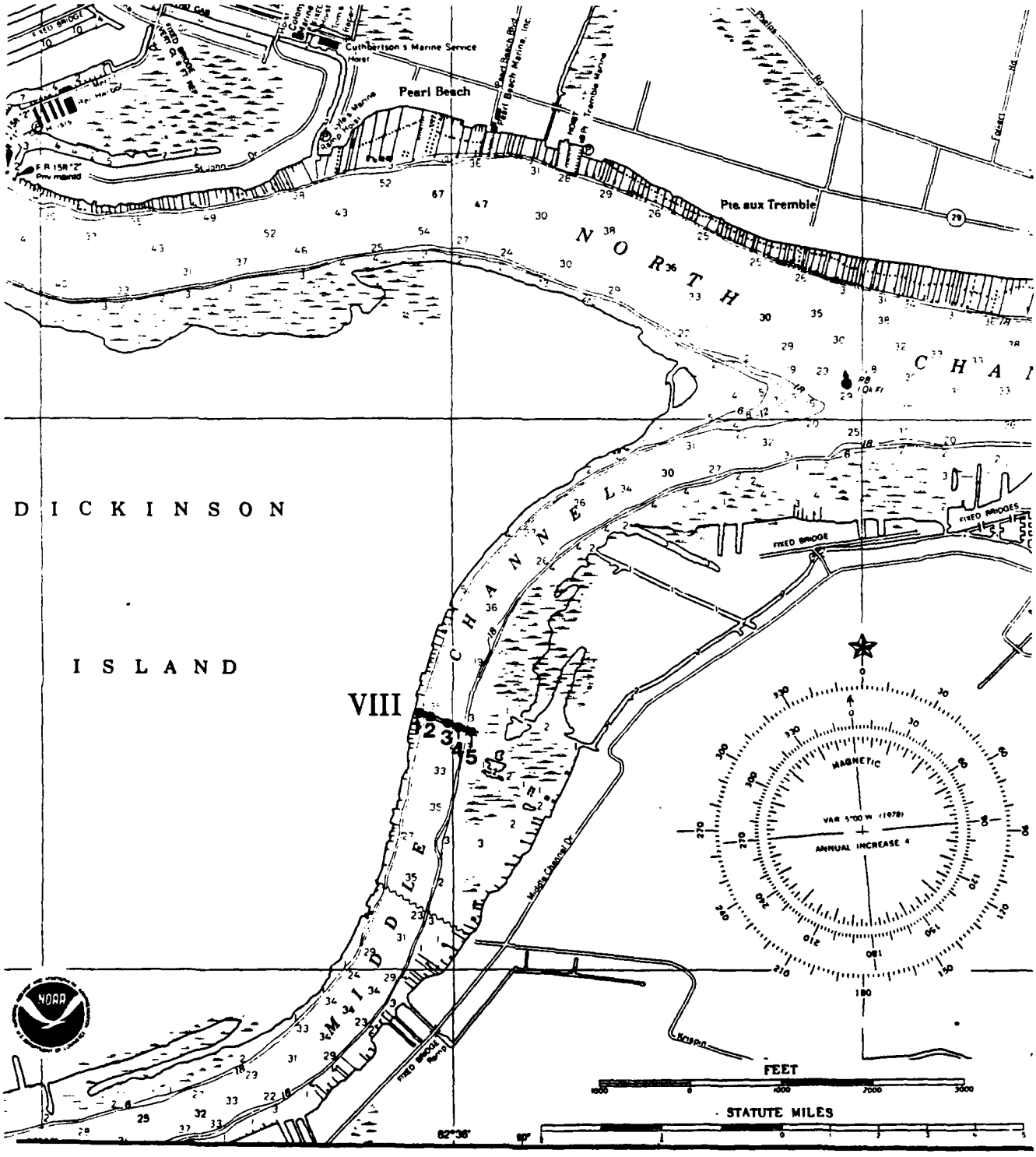


Transect VII was located 15 km downstream of transect VI in the St. Clair Cut-off Channel at Lights 7 and 8. Station 1 was about 10 m off the north shore; station 2 was about 25 m off the north shore; and station 3 was in mid-channel about 200 m from either shore. Water depth at stations 1, 2, 3, 4, and 5 respectively, was 1.2, 10.1, 10.1, 10.4, and 1.2 m.

ST. CLAIR RIVER

TRANSECT VII

Fig. 5

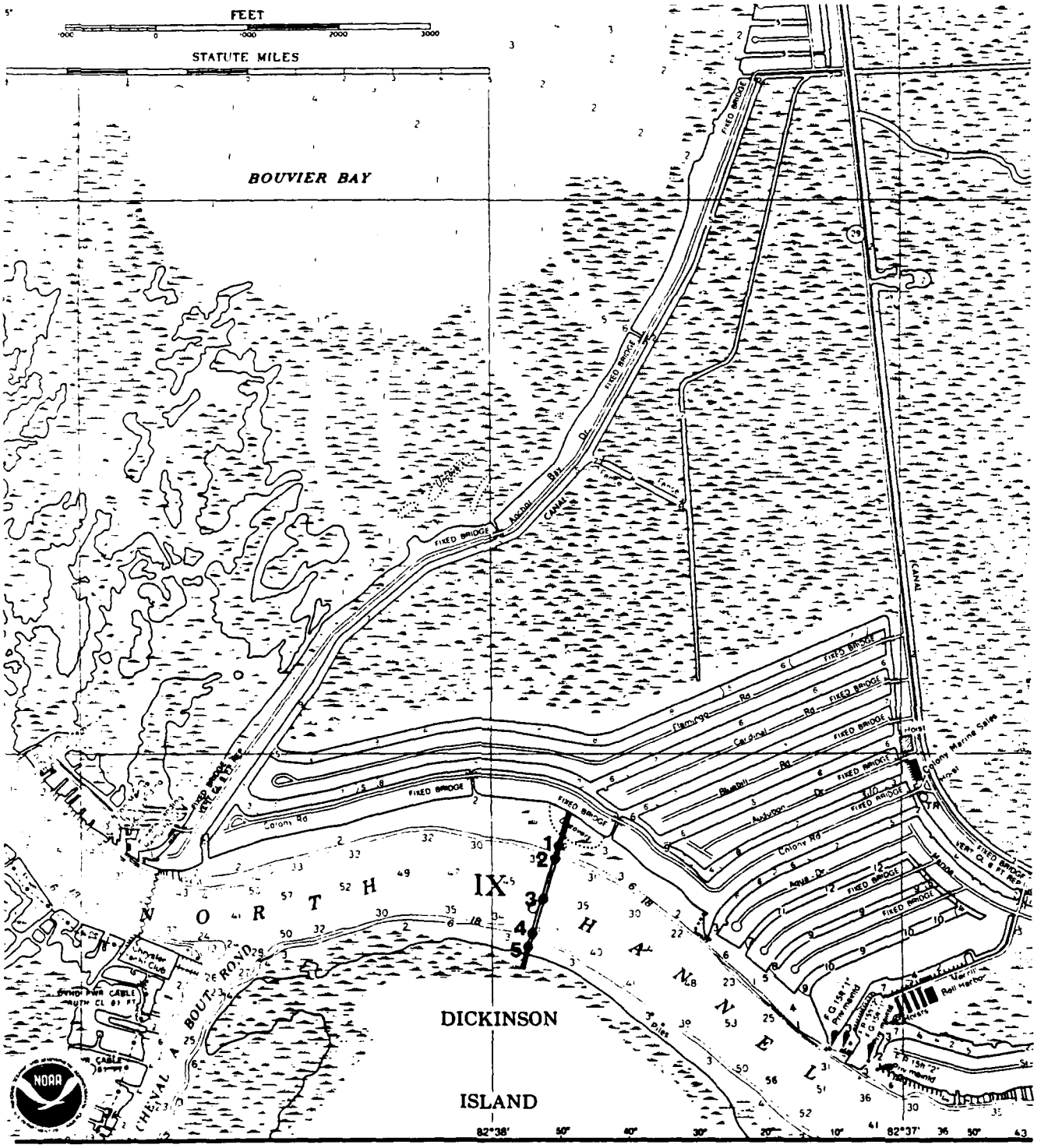


Transect VIII was located in the Middle Channel approximately 11 km downstream from transect VI. Station 1 was about 15 m off the east side of Dickenson Island; station 2 was in mid-channel about 120 m from the island; station 4 was about 165 m off the island; and station 5 was about 185 m off the island. Water depth at stations 1, 2, 3, 4, and 5 respectively was 7.6, 13.4, 14.6, 13.7, and 1.5 m.

ST. CLAIR RIVER

TRANSECT VIII

Fig. 6

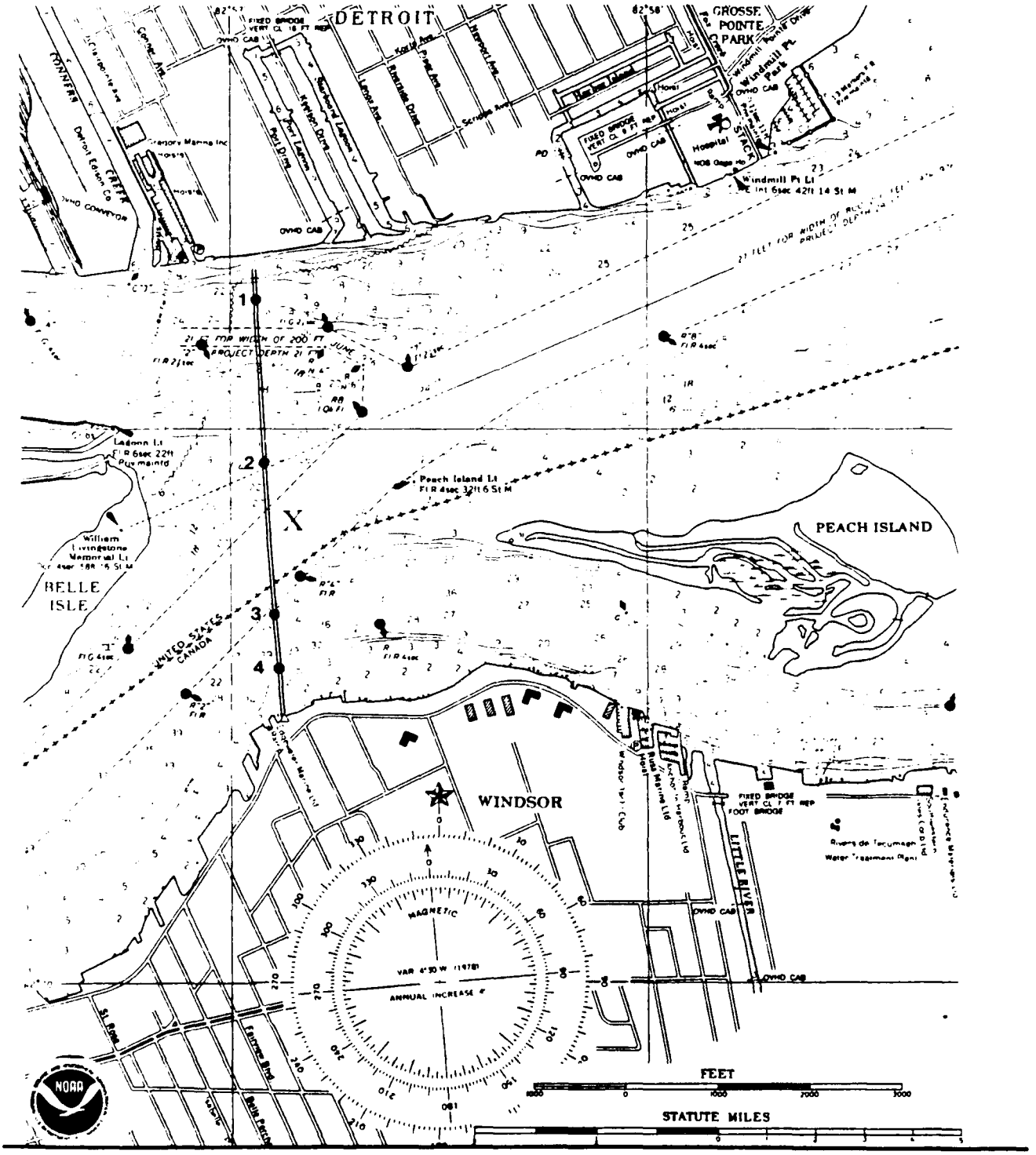


Transect IX was located in the North Channel north of Dickenson Island about 10.5 km below transect VI. Station 1 was about 150 m off the north shore; station 2 was about 180 m off the north shore; station 3 was in mid-channel about 300 m from the north shore and 180 m from the south shore; station 4 was about 75 m from the south shore; and station 5 was about 45 m from the south shore. Water depth at stations 1, 2, 3, 4, and 5 respectively, was 1.2, 12.2, 13.4, 12.5, and 0.9 m.

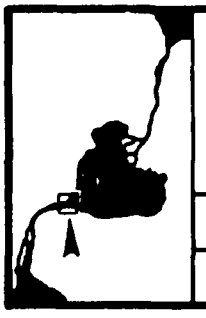
ST. CLAIR RIVER

TRANSECT IX

Fig. 7



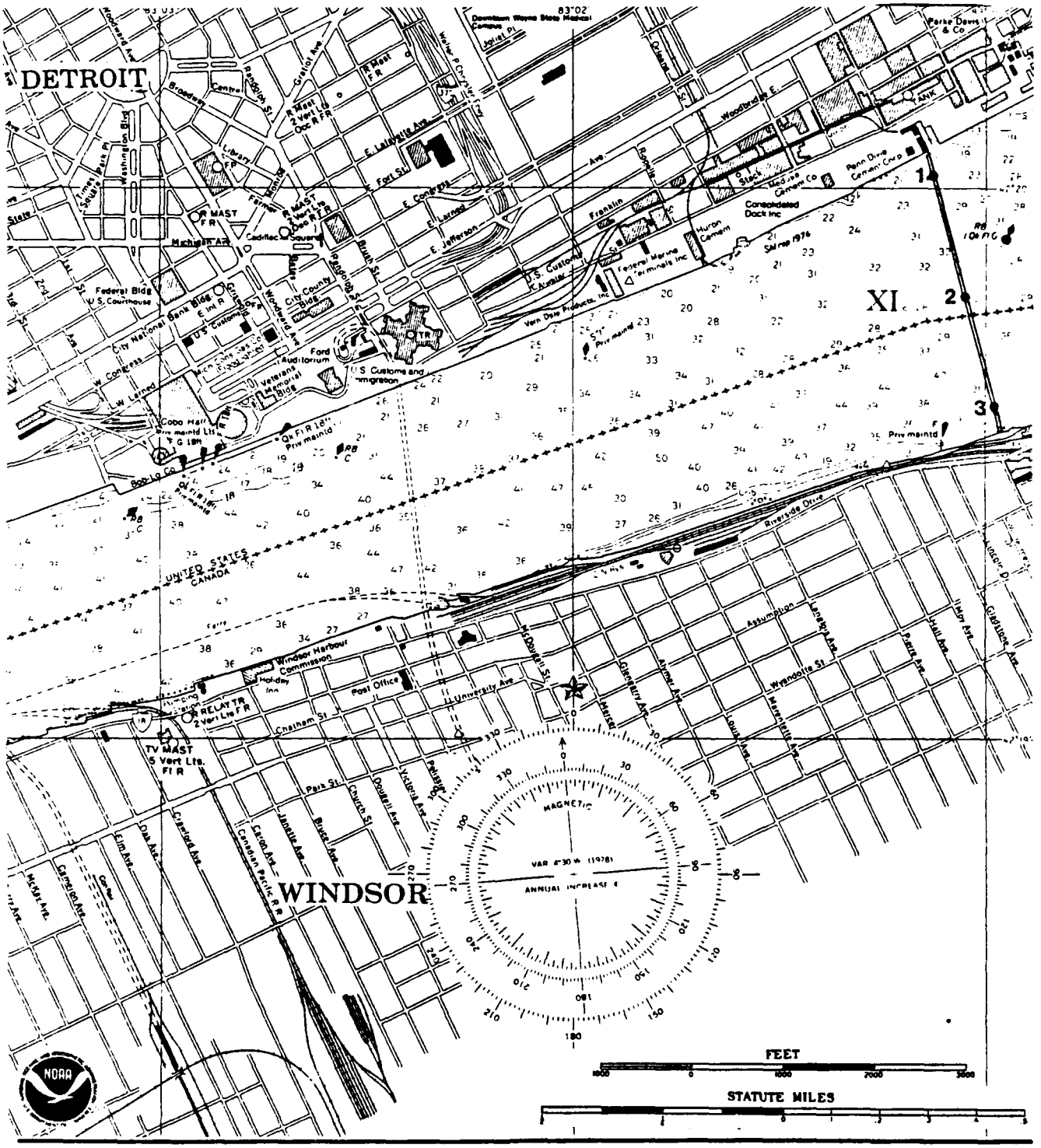
Transect X was located at the head of the Detroit River between Belle Isle and Peach Island. Station 1 was on the U.S. side of the river about 150 m offshore; station 2 was about 670 m off the U.S. shore; station 3 was in mid-channel about 1200 m from the U.S. shore and about 330 m from the Canadian side; and station 4 was about 150 m off the Canadian side. Water depth at stations 1, 2, 3, and 4 respectively, was 6.1, 4.6, 10.1, and 1.5 m.



DETROIT RIVER

TRANSECT X

Fig. 8

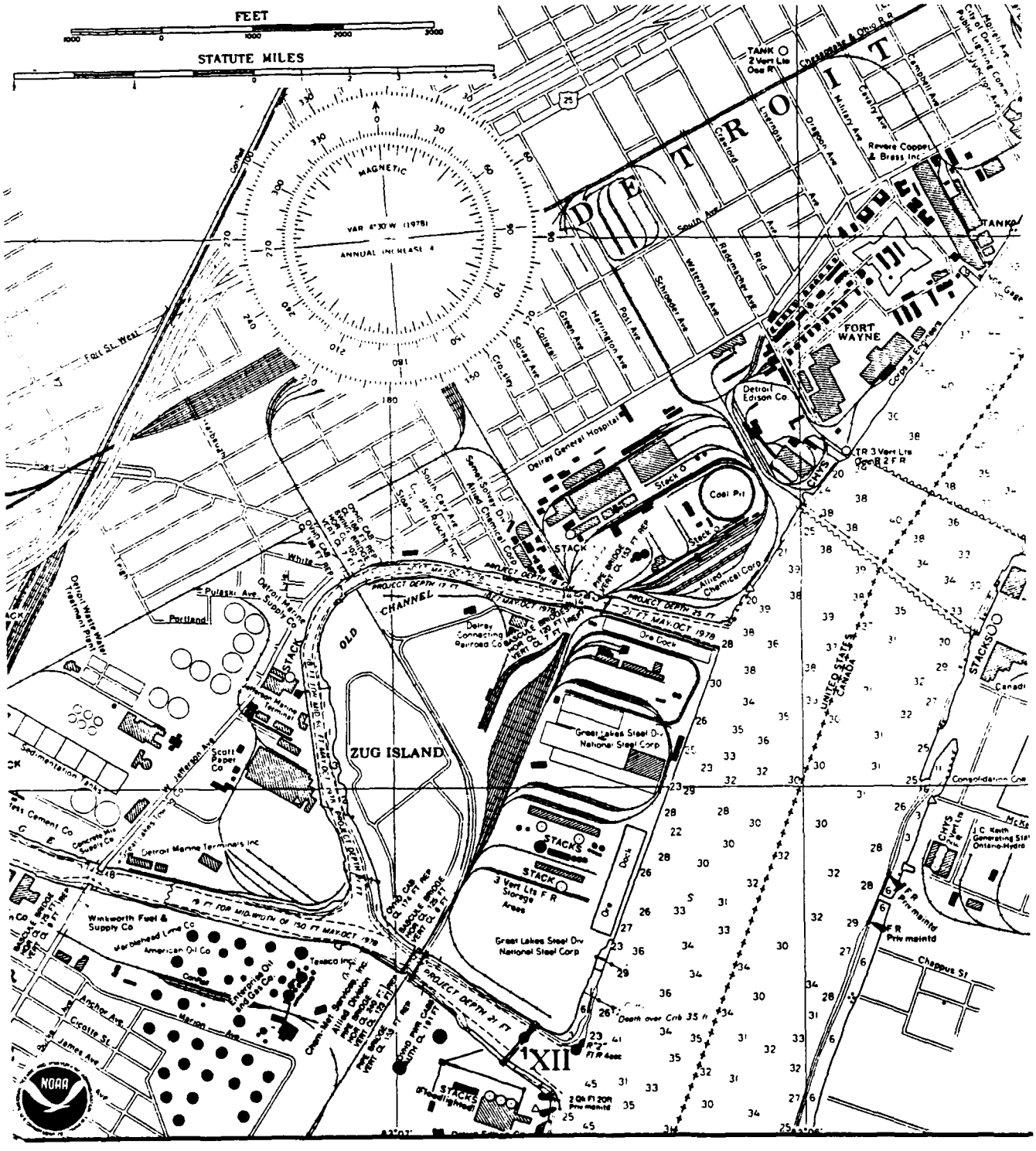


Transect XI was located about 6 km downstream of transect X. Station 1 was on the U.S. side of the river, about 75 m offshore; station 2 was in mid-channel about 1000 m from either shore; and station 3 was on the Canadian side about 100 m offshore, just downstream of the ship docking crib at the Hiram Walker and Sons Ltd. Distillery. Water depth at stations 1, 2, and 3 respectively, was 6.1, 10.4, and 10.1 m.

DETROIT RIVER

TRANSECT XI

Fig. 9

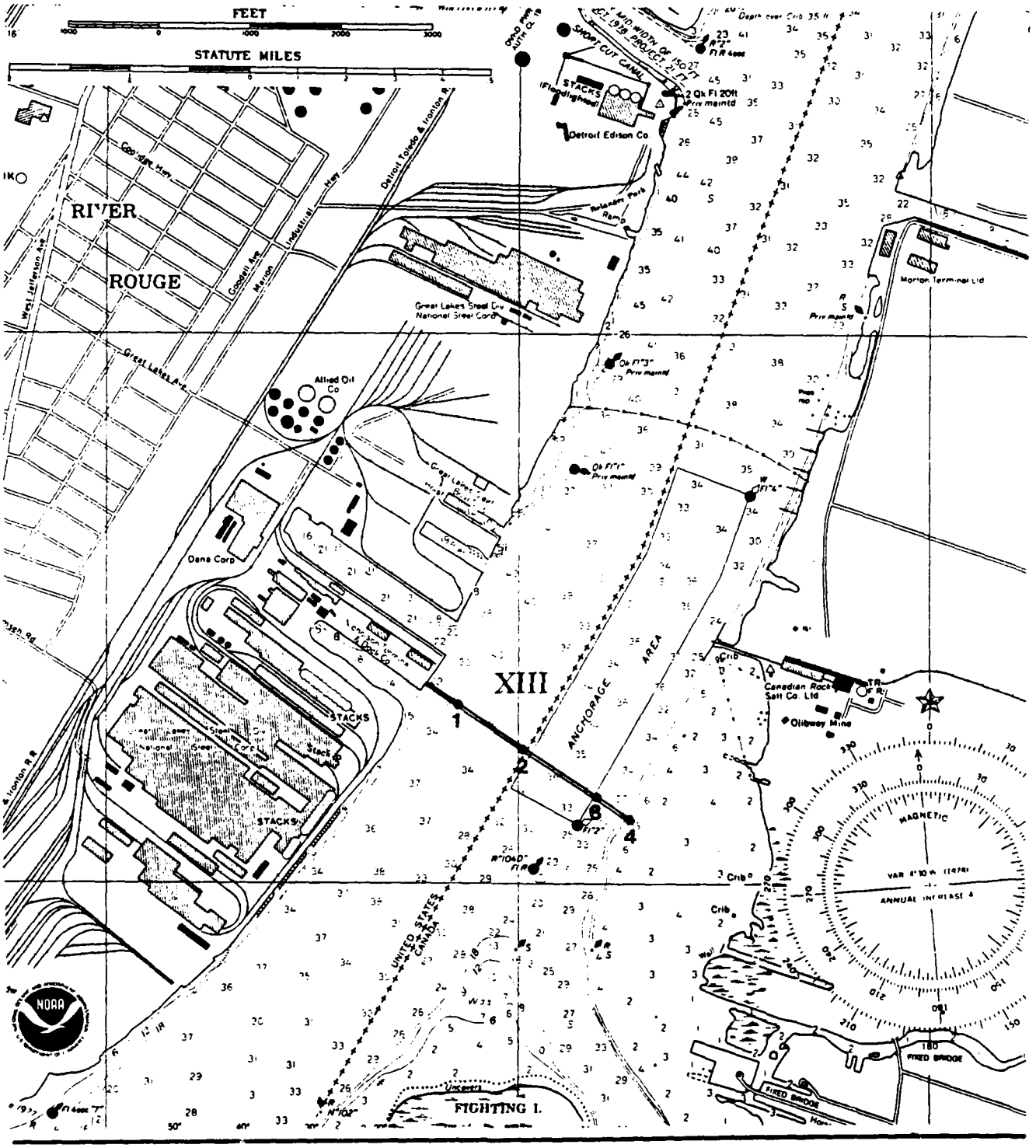


Transect XII was located at the mouth of the Rouge River Short-cut Canal, opposite the Detroit Edison Co. Station 1 was in mid-channel and water depth was 9.1 m.

DETROIT RIVER

TRANSECT XII

Fig. 10

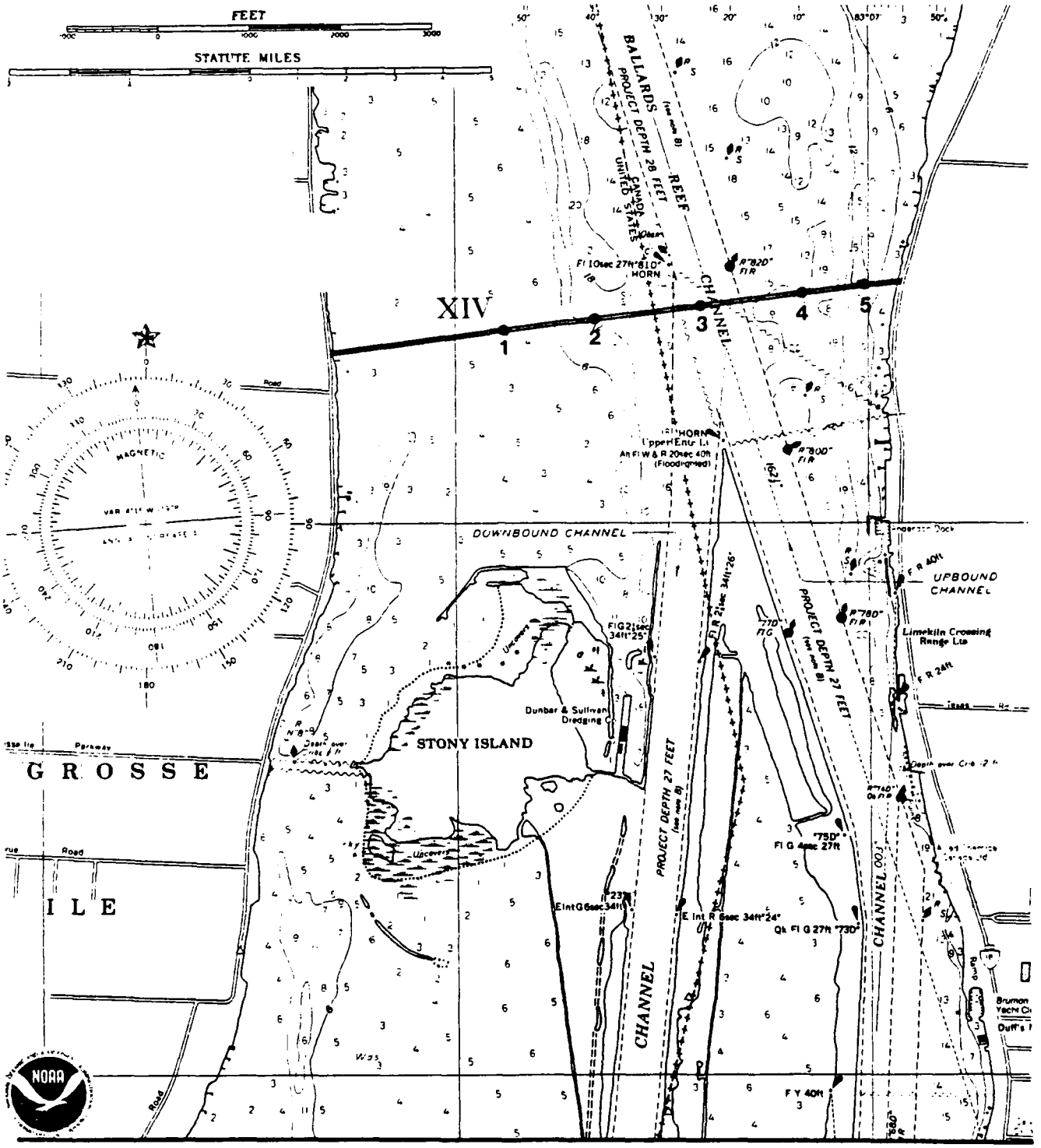


Transect XIII was located about 12 km downstream of transect XI and 1.7 km downstream of the mouth of the Rouge River Short-cut Canal. Station 1 was on the U.S. side of the river, about 150 m off shore; station 2 was in mid-channel about 400 m from the U.S. shore; station 3 was on the Canadian side about 600 m off shore, and station 4 was about 500 m off shore of the Canadian shore. Water depths at stations 1, 2, 3, and 4 respectively, was 11.0, 11.6, 11.0, and 10.4 m.

DETROIT RIVER

TRANSECT XIII

Fig. 11

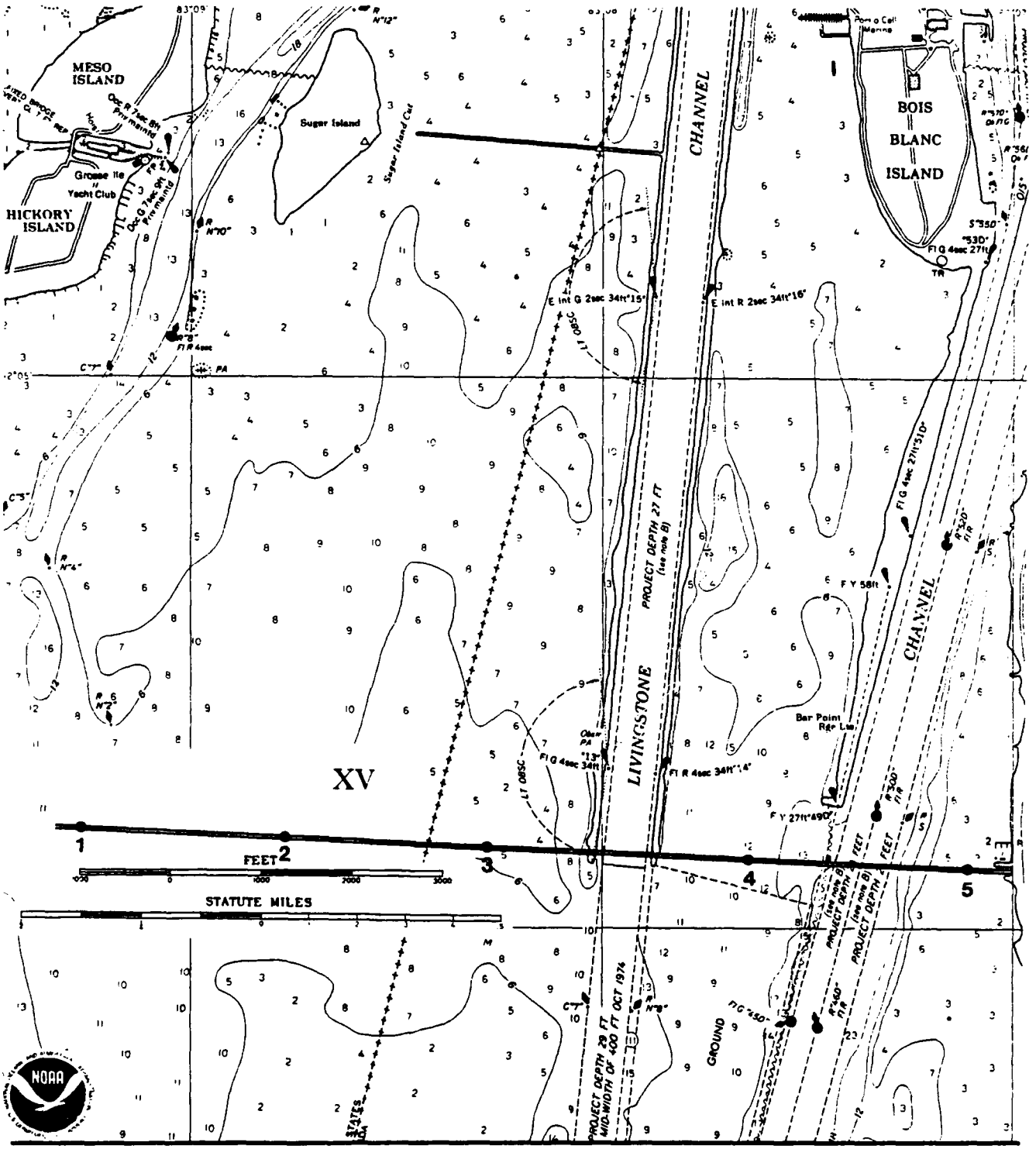


Transect XIV was located 850 m off Stoney Island. Station 1 was on the U.S. side of the river, 580 m off shore; station 2 was 850 m off shore; station 3 was in mid-channel, 900 m from the U.S. shore and 670 m from the Canadian shore; station 4 was on the Canadian side, 300 m from shore; and station 5 was 120 m off shore. Water depth at stations 1, 2, 3, 4, and 5 respectively, was 3.0, 6.7, 10.4, 7.3, and 3.0 m.

DETROIT RIVER

TRANSECT XIV

Fig. 12



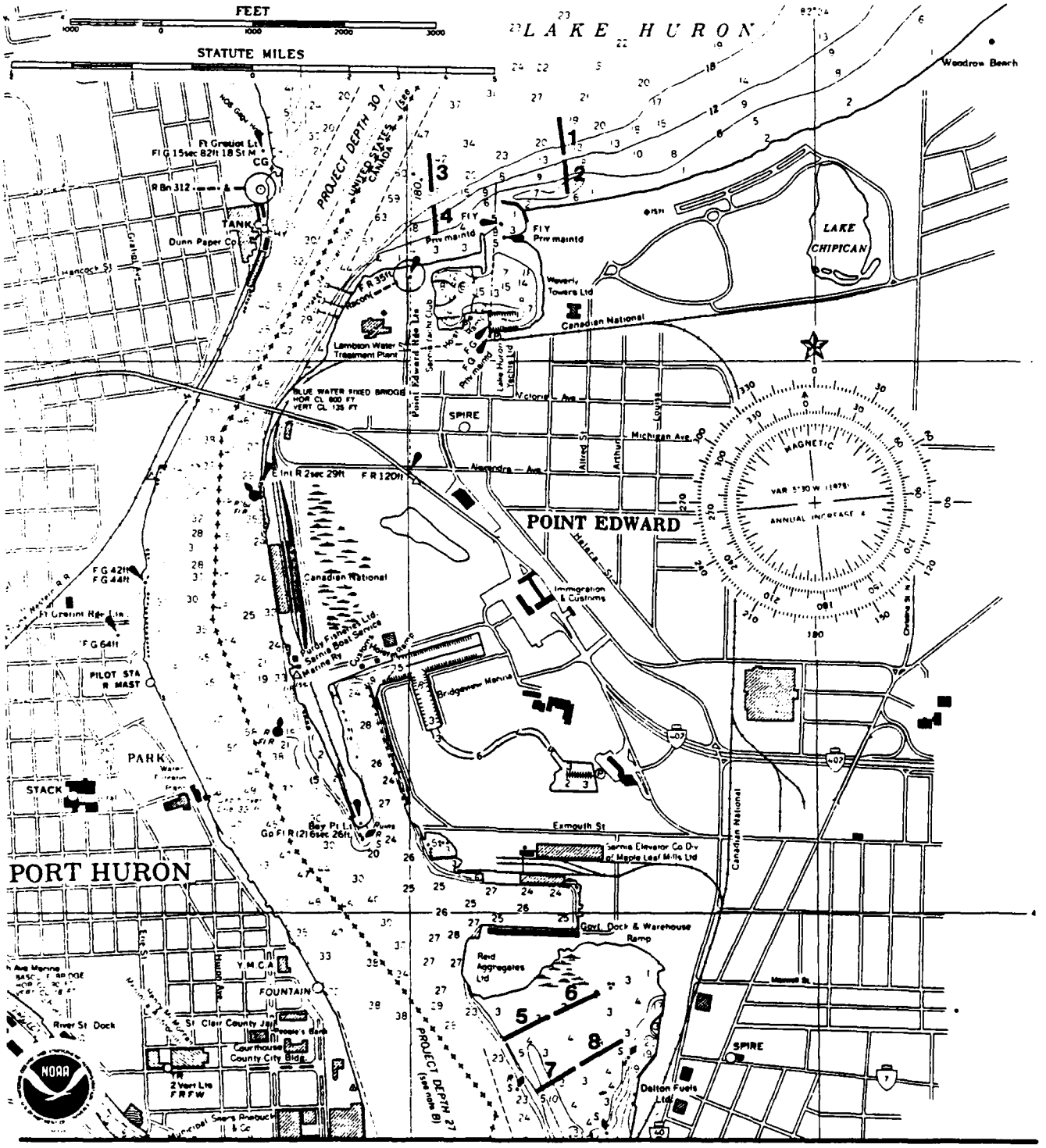
Transect XV was located at the end of the Livingston Channel running east and west to the Riverside Marina on the Canadian side. Station 1 was on the U.S. side, 1700 m east of the end of Livingston Channel; station 2 was in U.S. waters, 1000 m east of the end of the Livingston Channel; station 3 was in Canadian waters, 360 m east of the end of the Livingston Channel; station 4 was in Canadian waters 300 meters west of the channel; and station 5 was 150 m off the Canadian shore. Water depth at stations 1, 2, 3, 4, and 5 respectively, was 3.2, 3.7, 3.0, 4.3, and 1.5 m.

DETROIT RIVER

TRANSECT XV

Fig. 13

APPENDIX 2. Sampling locations for fish larvae.

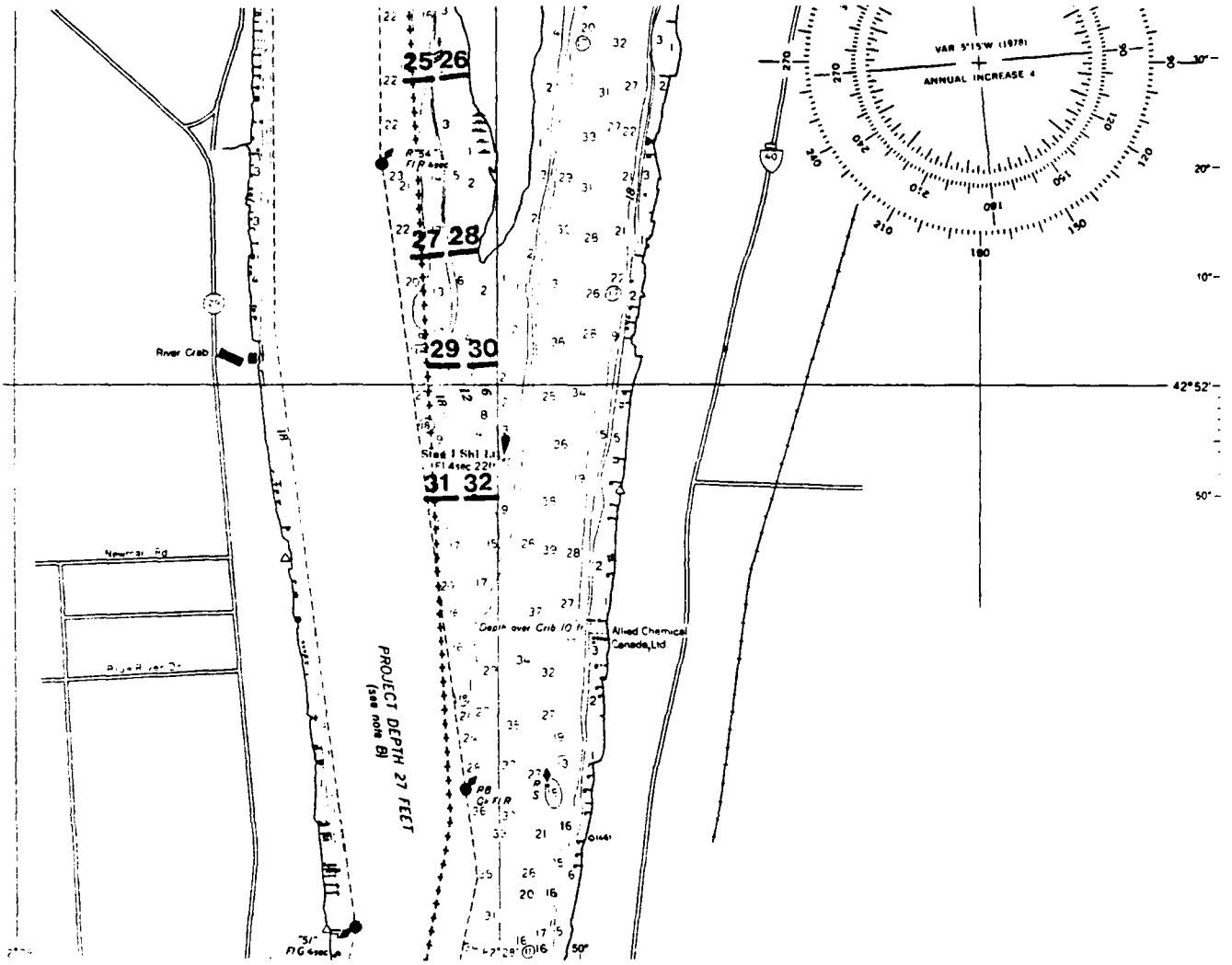


Point Edward location includes 4 stations in Lake Huron proper, and 4 in shallow waters of the St. Clair River off Sarnia. Stations 1-4 are located approximately 200-200m N.E. of Point Edward range light, and stations 5-8 are located in the shallow bay just opposite downtown Sarnia.

ST. CLAIR RIVER

STATIONS 1-8

Fig. 1.

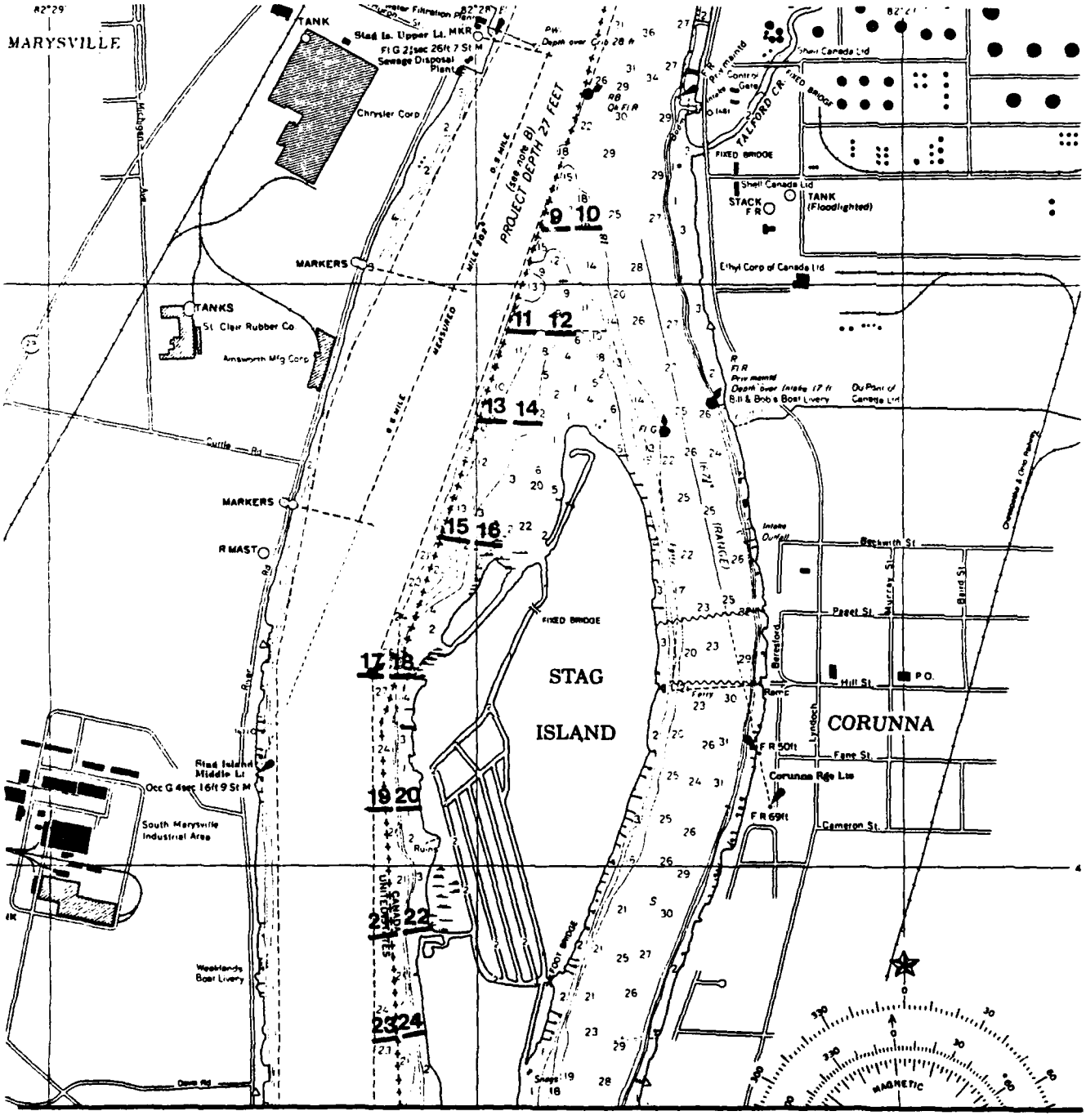


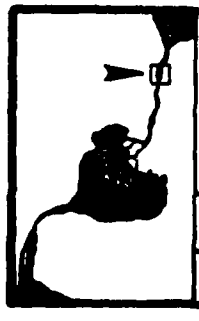
Stag Island location includes 12 pairs of stations (numbers 9-32) evenly distributed along the west side of Stag Island starting 600m N. of the Island and extending to 600m S. of the Island.

ST. CLAIR RIVER

STATIONS 9-32

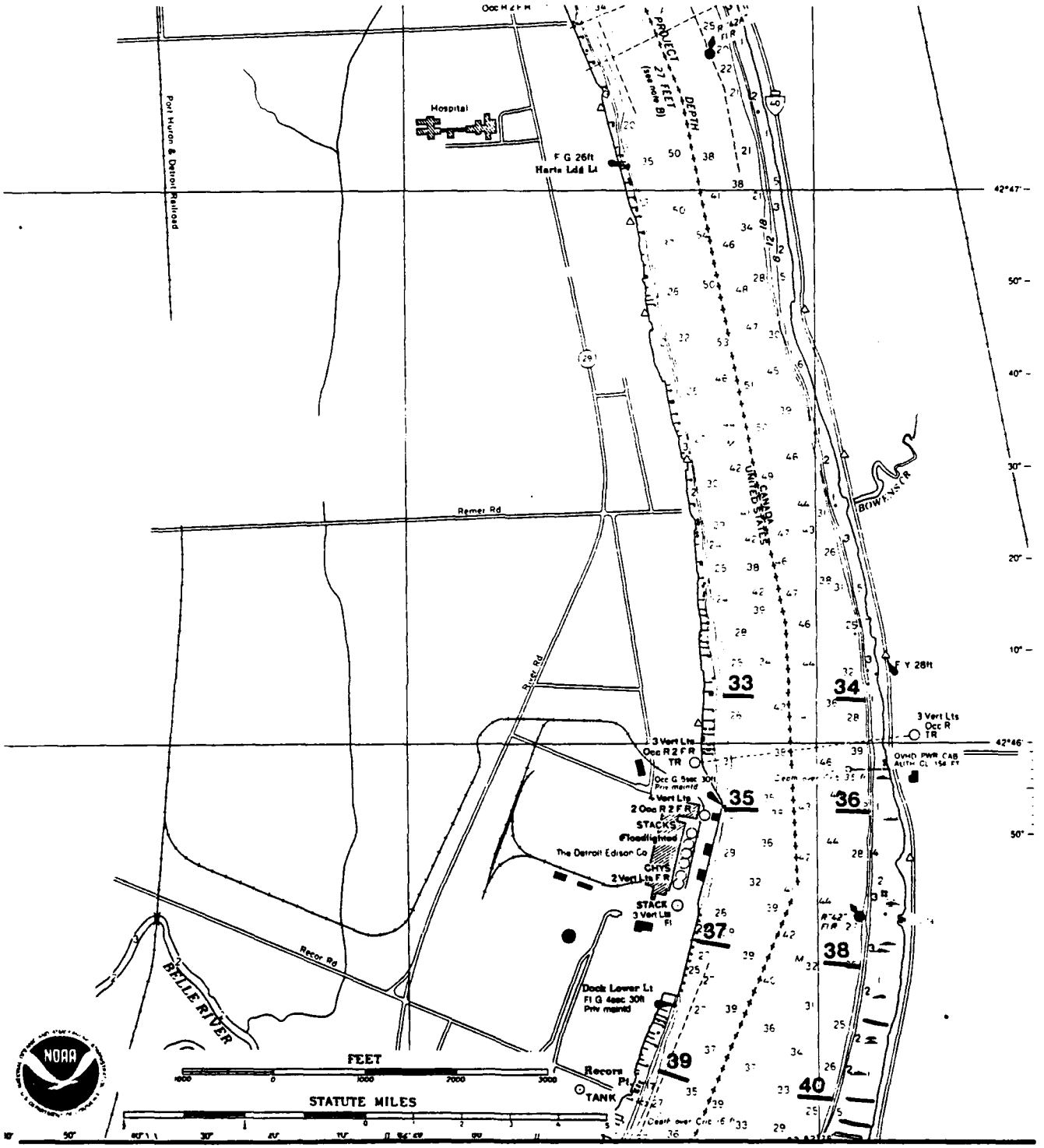
Fig. 2.





ST. CLAIR RIVER

Fig. 2 cont.

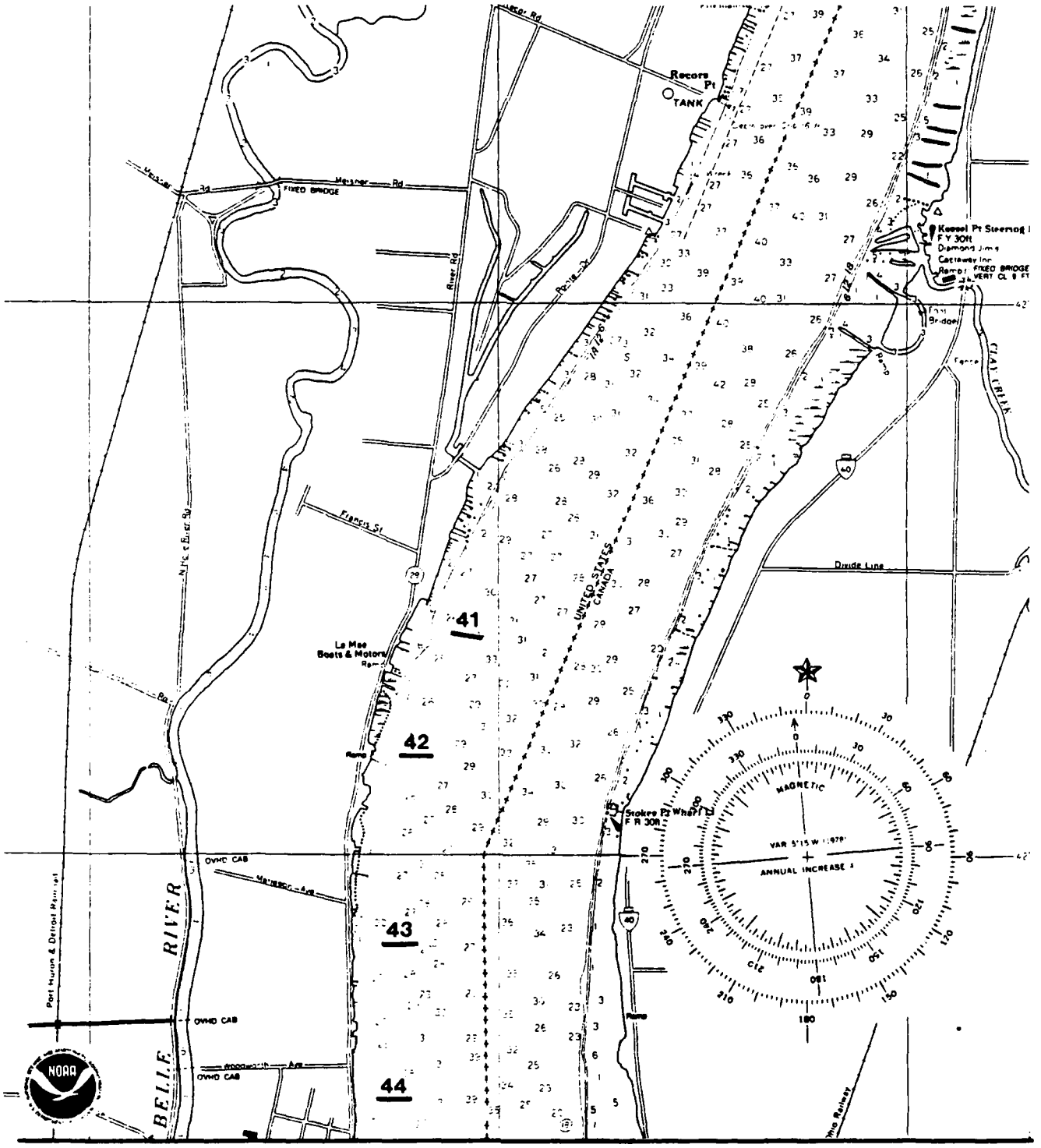


St. Clair Power Plant location includes 4 stations on the U.S. side and 4 directly across the river on the Ontario shore. Stations 33 and 34 are located about 350m N. of the power plant, stations 35 and 36 are sited just opposite the N. end of the plant, stations 37 and 38 are located about 120 S. of the S. end of the plant, and stations 39 and 40 are located approximately 90m N. of Recors Point.

ST. CLAIR RIVER

STATIONS 33-40

Fig. 3.

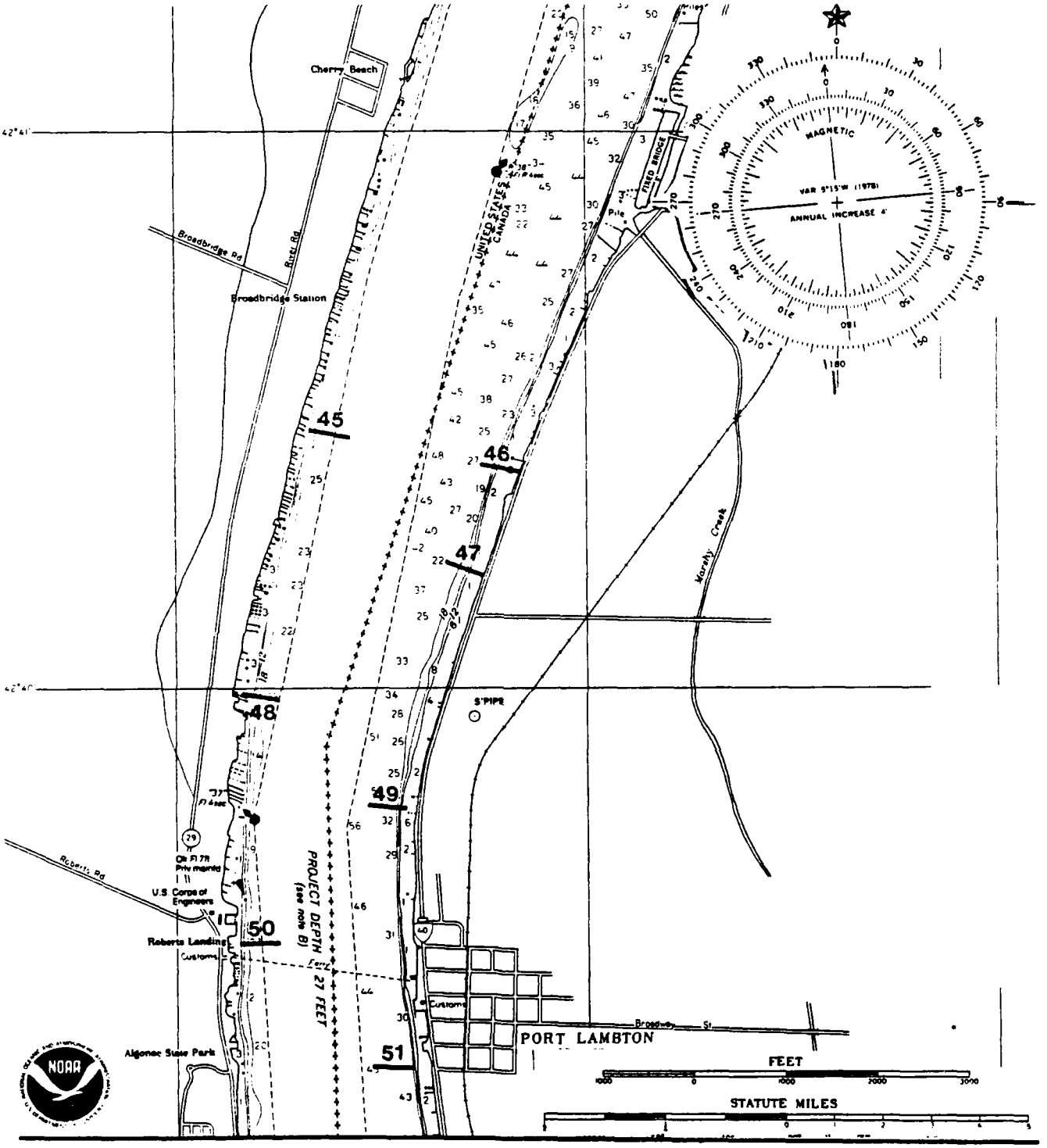


Marine City location includes 4 stations evenly distributed along the U.S. side of the river. Station 41 is located about 275m S. of the junction of Francis St. and Route 29, and station 44 is approximately 120m S. of the junction of Woodworth Ave. and Route 29.

ST. CLAIR RIVER

STATIONS 41-44

Fig. 4.

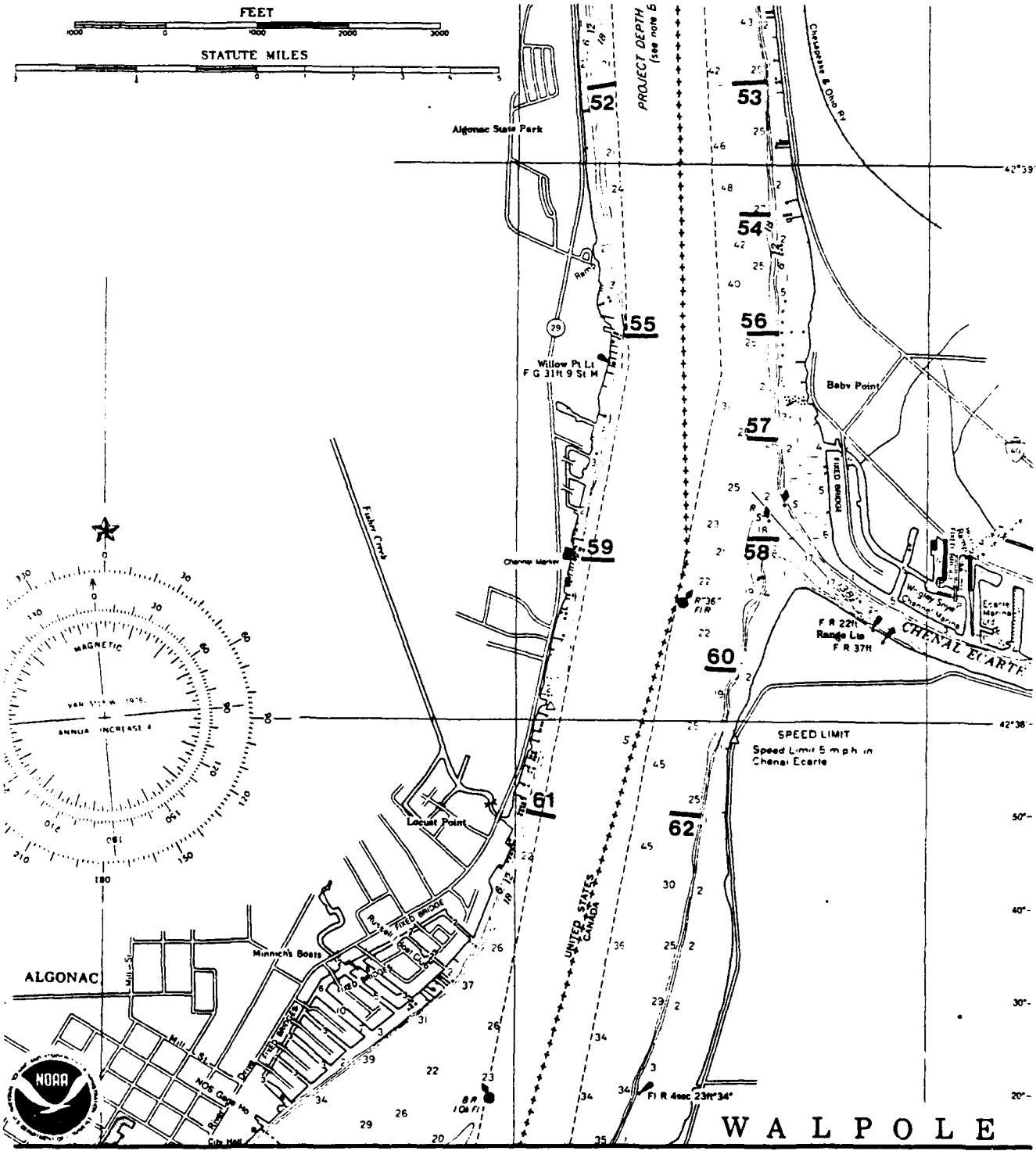


ST. CLAIR RIVER

STATIONS 45-51

Fig. 5.

Robert's Landing - Locust Point location includes 7 stations evenly spaced along the U.S. shore from a point 1.7 km N. of Robert's Landing to the mouth of Fisher Creek.

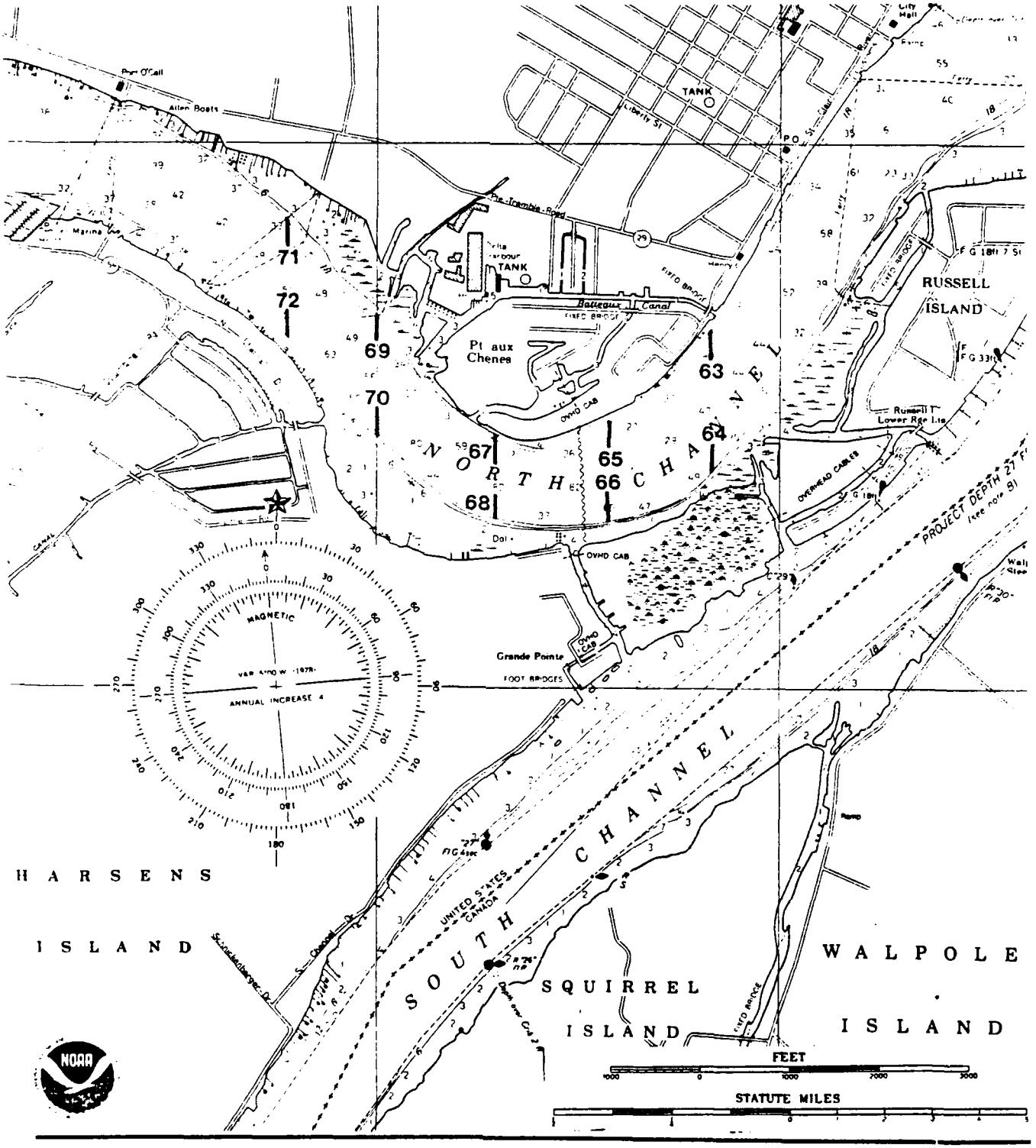


Port Lambton - Baby Point location includes 11 stations scattered along the Ontario shoreline from approximately 885m S. of the mouth of Marsly Creek to about 885m S. of the mouth of Chenal Ecarte'.

ST. CLAIR RIVER

STATIONS 52-62

Fig. 6.

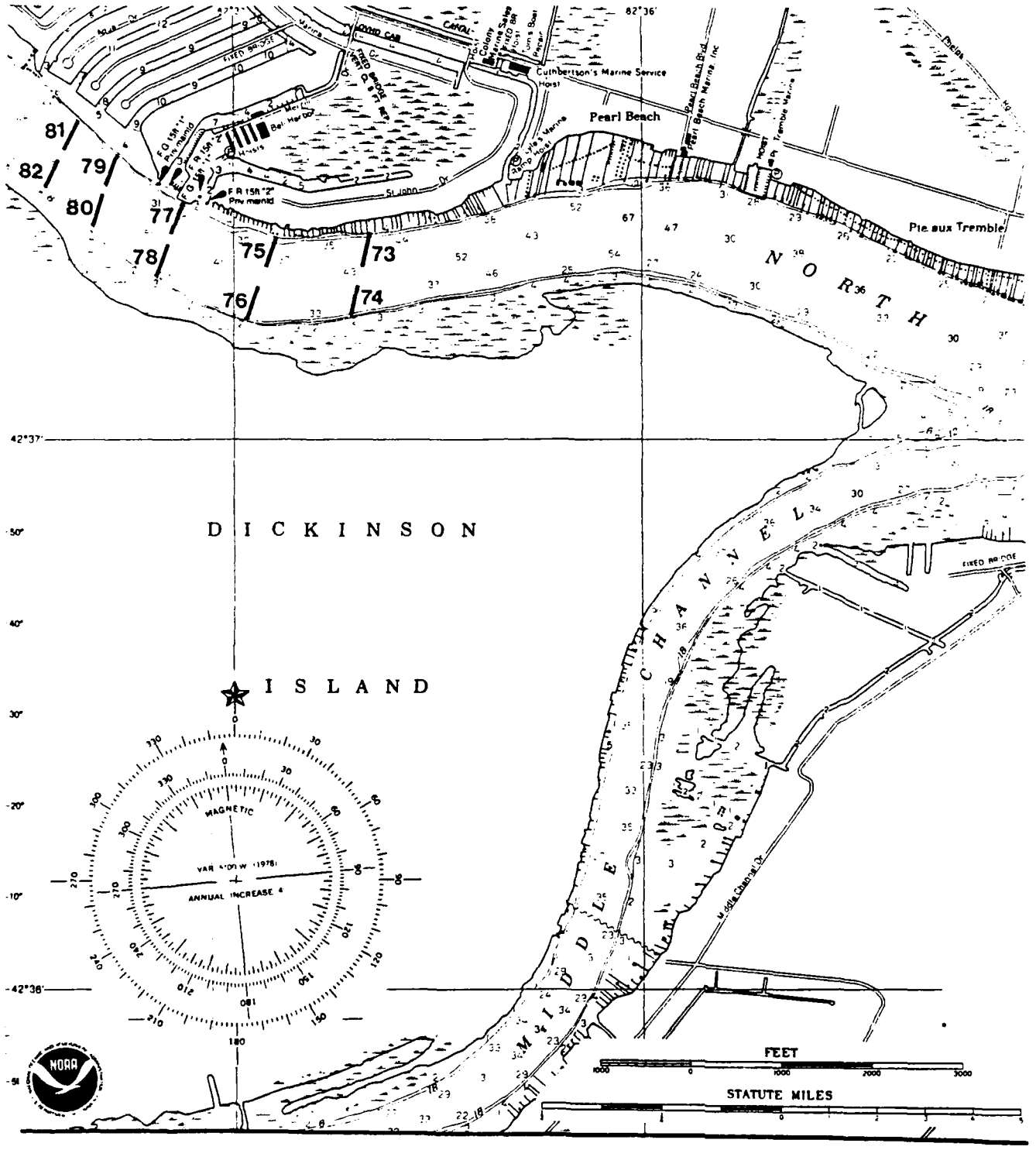


Point Aux Chenes locations includes 5 pairs of stations (numbers 63-72) in the North Channel between Batteaux Canal and a point about 670m N.W. of Point Aux Chenes. One station in each pair is located on the N. shore and the other is on the S. shore.

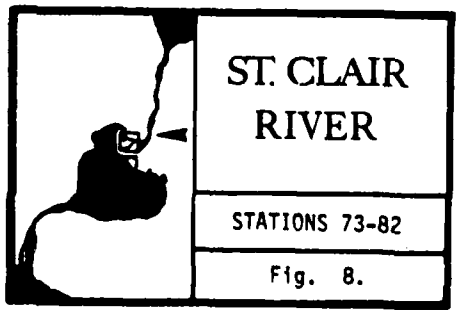
ST. CLAIR RIVER

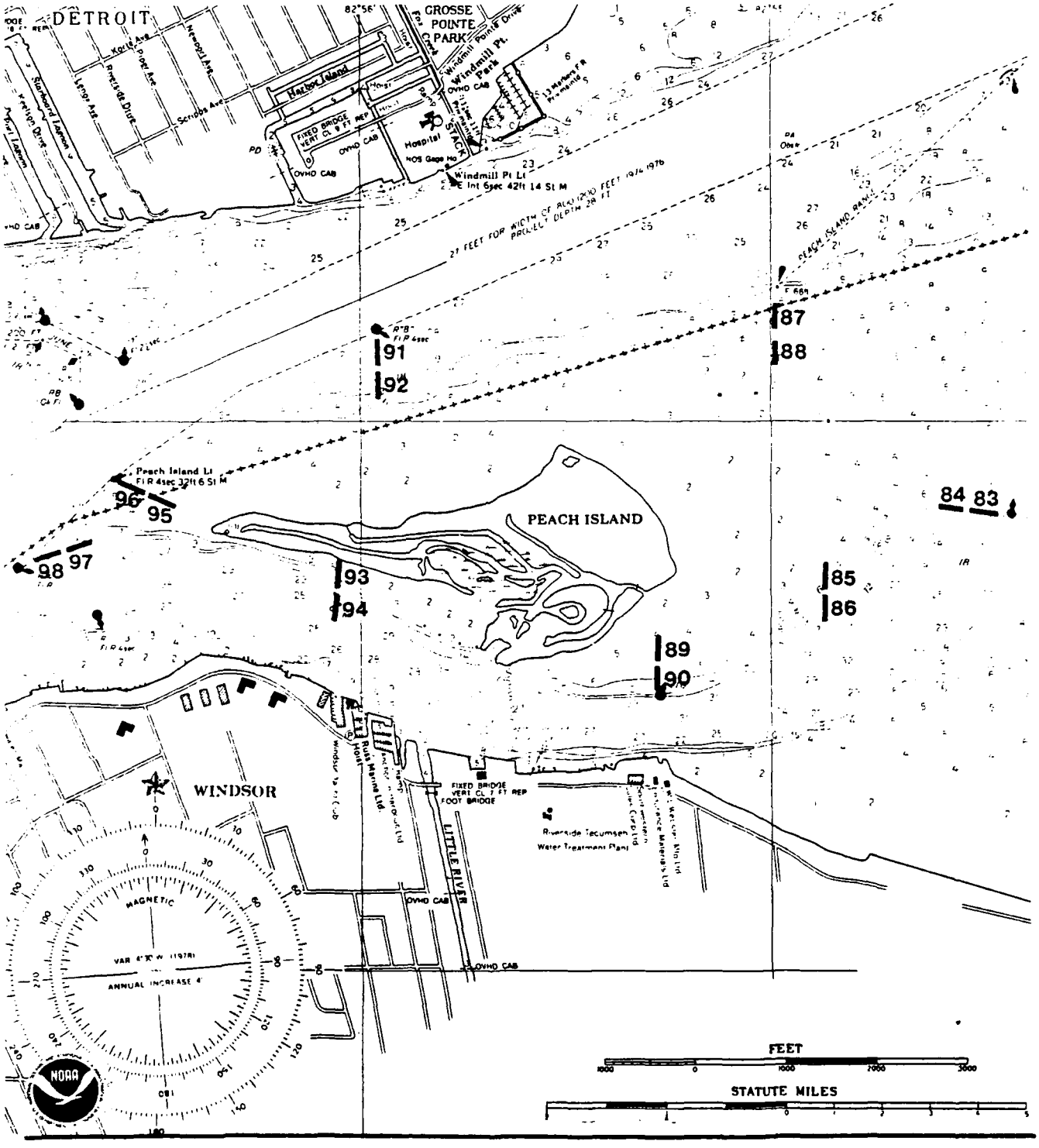
STATIONS 63-72

Fig. 7.



Bell Harbor location includes 5 pairs of stations (numbers 73-82) with one of each pair located on the S. shore and the other on the N. shore N. of Dickinson Island.



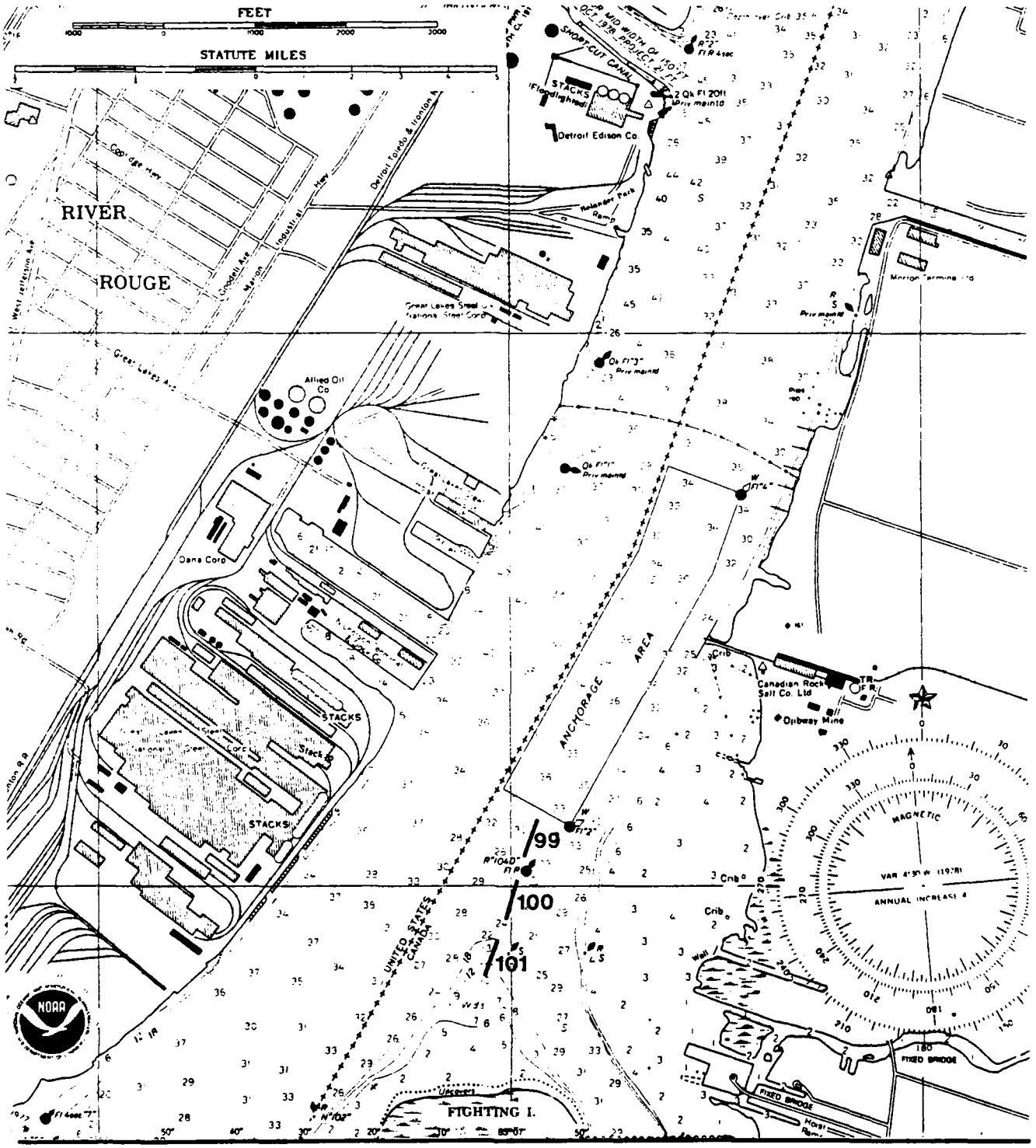


Peach Island location includes 8 pairs of stations (numbers 83-98) scattered around Peach Island.

DETROIT RIVER

STATIONS 83-98

Fig. 9.

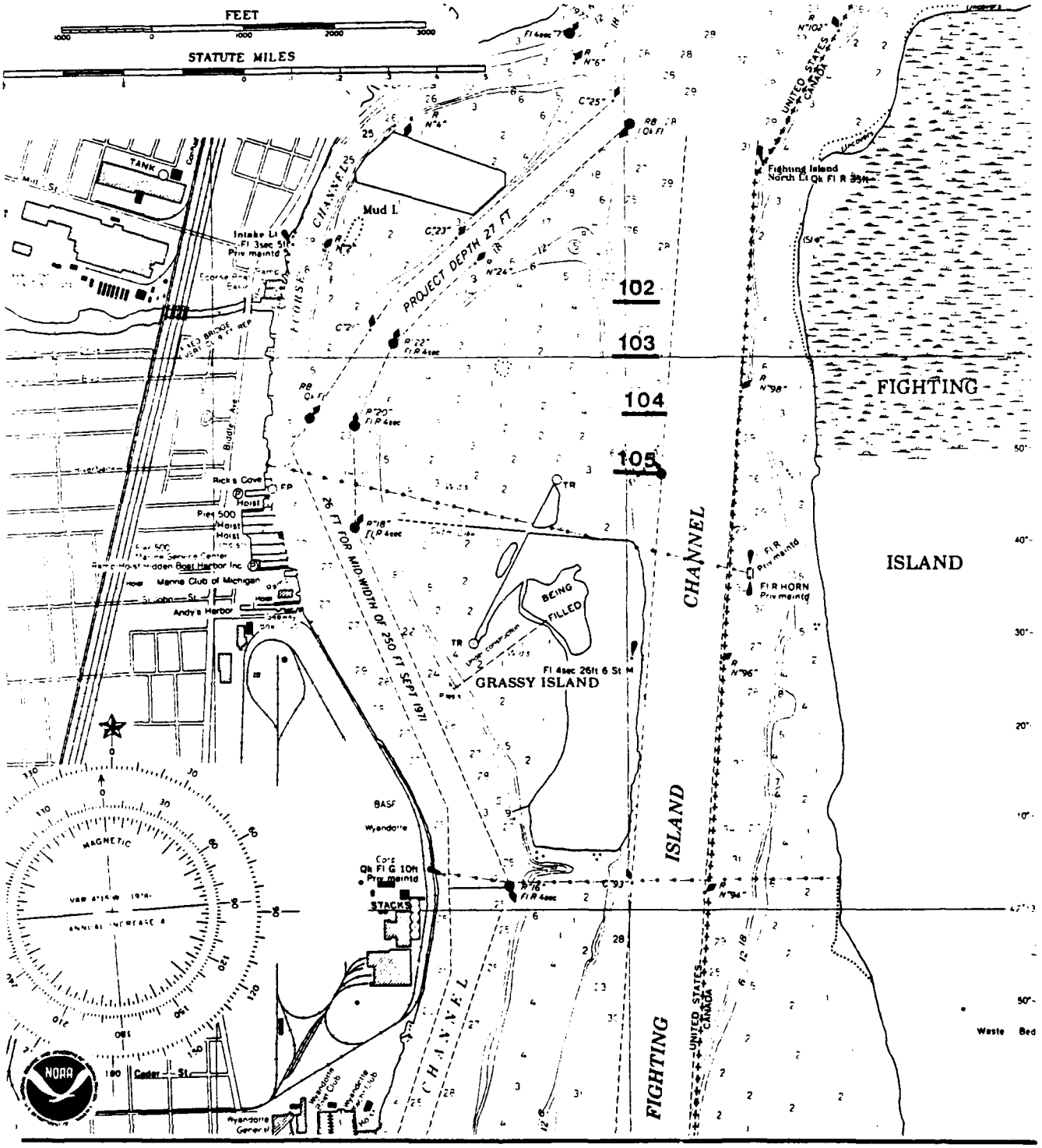


Fighting Island location includes 3 stations (numbers 99-101) located between 460 and 820m N. of Fighting Island.

DETROIT RIVER

STATIONS 99-101

Fig. 10.

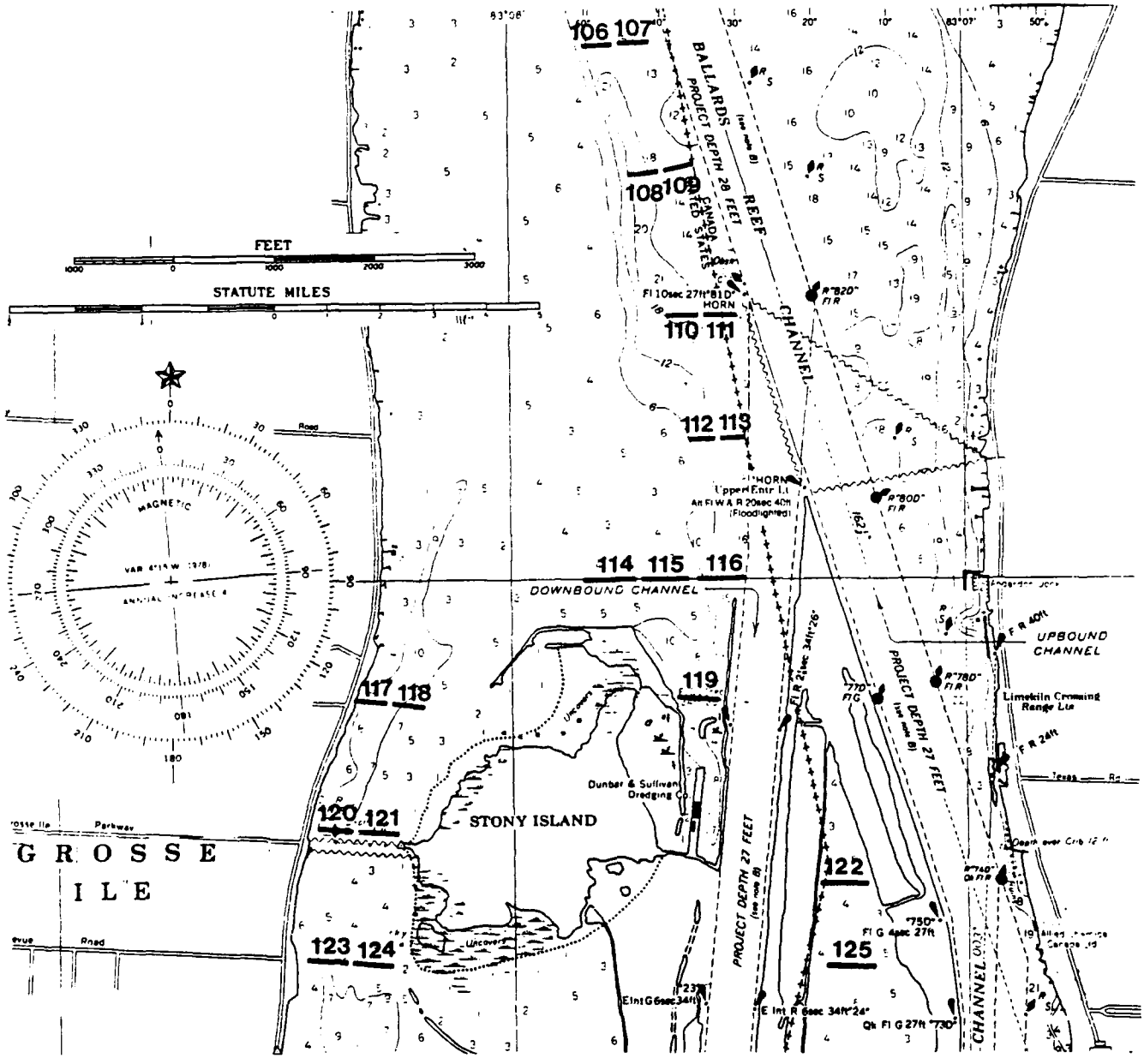


Grassy Island location includes 4 stations evenly spaced between 245 and 790m N. of Grassy Island.

DETROIT RIVER

STATIONS 102-105

Fig. 11.

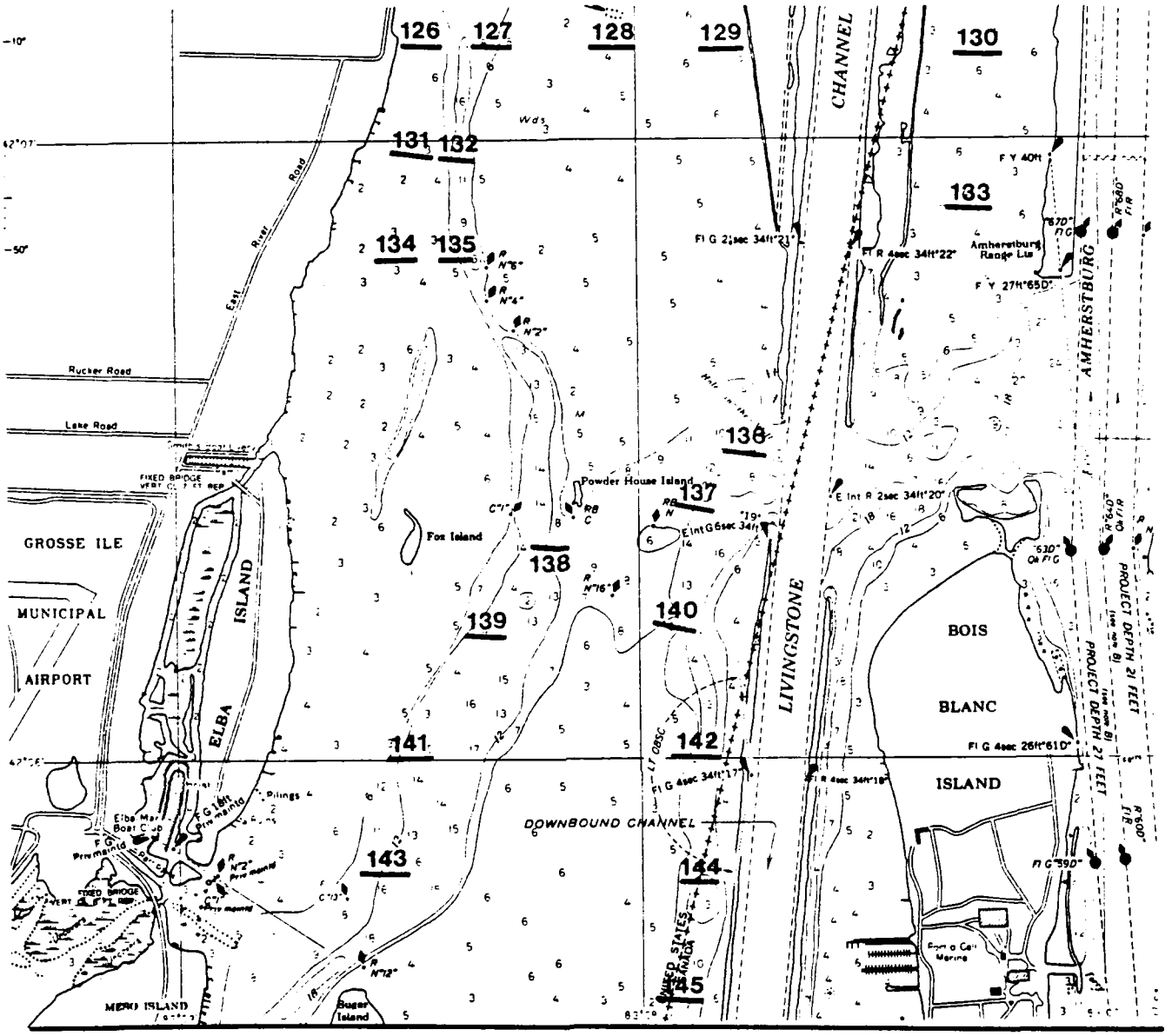


Stony Island - Crystal Bay location includes 40 stations (numbers 106-145) scattered in the waters around Stony Island and at other locations from a point 1.8 km above the Island down to a point even with the tip of Sugar Island.

DETROIT RIVER

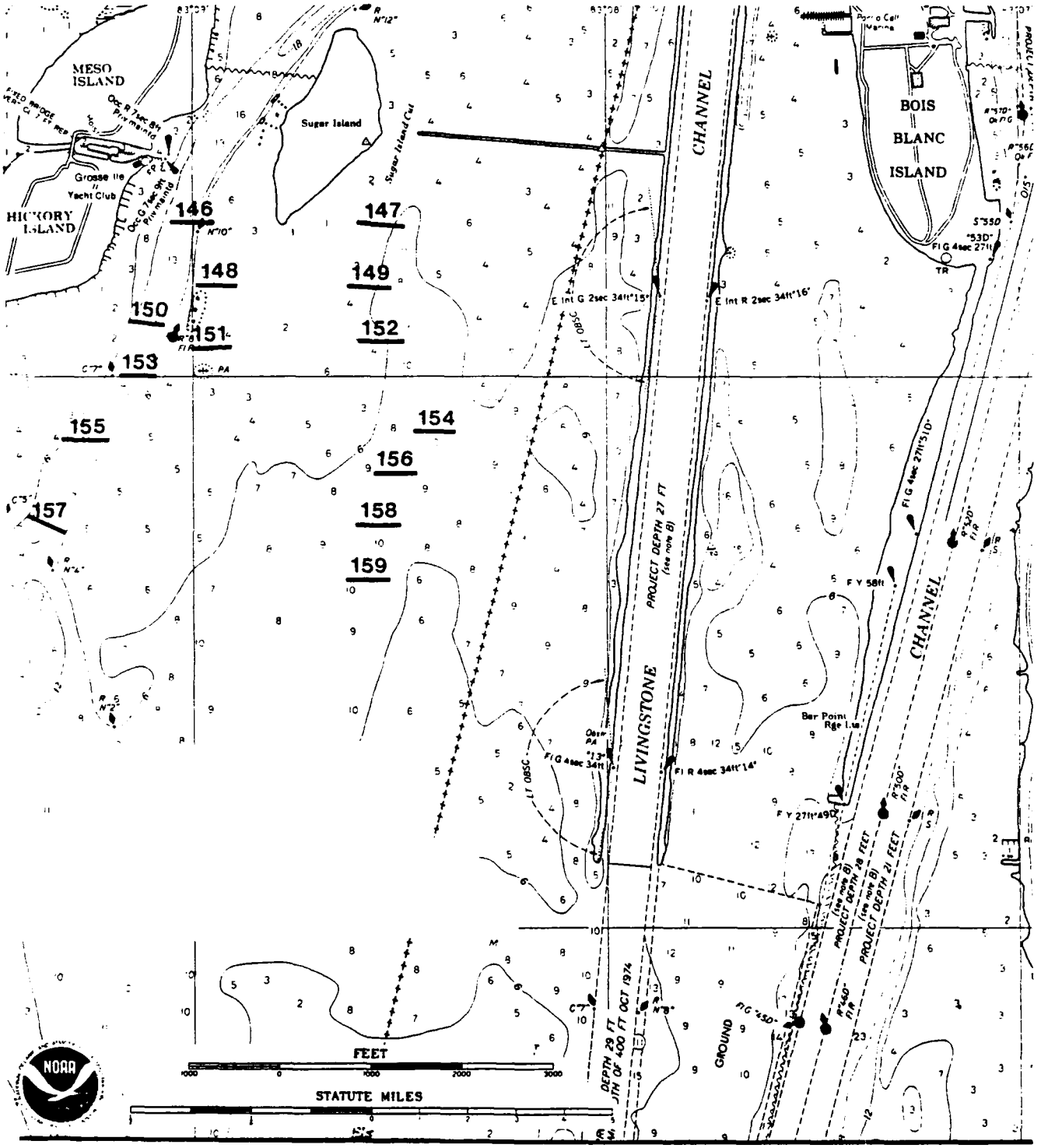
STATIONS 106-145

Fig. 12.



DETROIT RIVER

Fig. 12 cont.



Sugar Island - Hickory Island location includes 14 stations (numbers 146-159); 7 were S.E. of Hicory Island and 7 were S.S.E. of Sugar Island.

DETROIT RIVER

STATIONS 146-159

Fig. 13.

APPENDIX 3. Field data for egg sampling. Water depth on station is in feet.

RIVER=ST. CLAIR

STATION	YEAR	MONTH	TIME	TEMP	DEPTH	BOTTOM TYPE	LORANU	LORANL
1	1983	May	10:35	44.0	20	SAND&GRAVEL	574816	442792
1	1984	June	09:12	53.0	23	SAND	574914	442594
2	1983	May	10:50	45.0	9	SAND	574721	442792
2	1984	June	09:24	52.0	10	SAND	574904	442587
3	1983	May	11:00	44.0	38	SAND&GRAVEL	574789	442680
3	1984	June	09:32	52.0	18	SAND	574885	442580
4	1983	May	11:09	44.0	8	SAND	574683	442577
4	1984	June	09:40	51.0	8	SAND	574881	442576
5	1983	May	11:30	45.0	6	MUD	574656	442604
5	1984	June	09:59	54.0	8	ORGANIC DEBRIS	574853	442504
6	1983	May	11:40	45.0	9	SAND&CLAY	574662	442413
6	1984	June	10:06	54.0	7	ORGANIC DEBRIS	574850	442505
7	1983	May	11:50	44.0	8	MUD	574552	442399
7	1984	June	10:15	53.0	9	ORGANIC DEBRIS	574858	442507
8	1983	May	12:00	45.0	7	MUD	574562	442603
8	1984	June	10:23	52.0	9	ORGANIC DEBRIS	574865	442512
9	1983	April	10:37	38.2	18	COARSE GRAVEL	574204	442224
9	1984	May	09:55	41.0	18	COARSE GRAVEL	574219	442152
10	1983	April	10:54	38.2	18	FINE GRAVEL	574120	441949
10	1984	May	10:08	41.0	21	FINE GRAVEL	574230	442154
11	1983	April	11:05	38.2	10	SAND&GRAVEL	574217	442146
11	1984	May	10:16	41.0	10	SAND&GRAVEL	574215	442144
12	1983	April	11:51	38.2	8	FINE GRAVEL	574322	442242
12	1984	May	10:26	41.0	9	FINE GRAVEL	574214	442143
13	1983	April	12:02	38.2	12	SAND&GRAVEL	574110	442137
13	1984	May	10:35	41.0	11	SAND&GRAVEL	574205	442134
14	1983	April	12:13	38.2	7	SAND&GRAVEL	574109	442136
14	1984	May	10:45	41.0	10	SAND&GRAVEL	574210	442134
15	1983	April	12:25	38.2	20	SAND&GRAVEL	574086	442120
15	1984	May	10:55	41.0	20	SAND&GRAVEL	574183	442117
16	1983	April	12:38	38.2	20	SAND&GRAVEL	574184	442118
16	1984	May	11:09	41.0	9	SAND&GRAVEL	574190	442119
17	1983	April	12:50	38.2	25	SAND&GRAVEL	574164	442099
17	1984	May	11:25	41.0	30	SAND&GRAVEL	574162	442101
18	1983	April	13:00	38.2	16	SAND&GRAVEL	574166	442096
18	1984	May	11:35	41.0	8	SAND&GRAVEL	574166	442102
19	1983	April	13:13	38.2	25	FINE GRAVEL	574159	442094
19	1984	May	11:50	41.0	27	FINE GRAVEL	574153	442086
20	1983	April	13:22	38.2	10	SAND	574158	442188
20	1984	May	11:57	41.0	8	SAND	574155	442086
21	1983	April	13:34	38.2	25	COARSE GRAVEL	574151	442178
21	1984	May	12:06	41.0	25	COARSE GRAVEL	574147	442076
22	1983	April	13:52	38.2	10	SAND&GRAVEL	574154	442084
22	1984	May	12:15	42.0	9	SAND&GRAVEL	574151	442080
23	1983	April	14:05	38.2	24	SAND&GRAVEL	574206	442162
23	1984	May	12:42	42.0	24	SAND&GRAVEL	574138	442062
24	1983	April	14:20	38.2	10	SAND&GRAVEL	574241	442161
24	1984	May	12:50	42.0	9	SAND&GRAVEL	574143	442066
25	1983	April	14:33	38.2	21	GRAVEL&CLAY	574135	442053
25	1984	May	13:00	41.0	20	GRAVEL&CLAY	574136	442055
26	1983	April	14:44	38.2	8	SAND&MUD	573942	442054
26	1984	May	13:10	42.0	8	SAND&MUD	574140	442056
27	1983	April	14:55	38.2	17	SAND	574226	441941
27	1984	May	13:18	42.0	21	SAND	574128	442041

RIVER=ST. CLAIR

STATION	YEAR	MONTH	TIME	TEMP	DEPTH	BOTTOM TYPE	LORANU	LORANL
28	1983	April	15:08	38.2	5	SAND&MUD	574232	442144
28	1984	May	13:27	42.0	9	SAND&MUD	574133	442043
29	1983	April	15:18	38.2	16	SAND&MUD	574224	442030
29	1984	May	13:25	42.0	31	SAND&MUD	574121	442033
30	1983	Ap.il	15:28	38.2	6	SAND&MUD	574326	442128
30	1984	May	13:45	42.0	12	SAND&MUD	574129	442033
31	1983	April	15:40	38.2	21	SAND	574023	442019
31	1984	May	13:55	42.0	24	SAND	574115	442017
32	1983	April	1[illegible]:52	38.2	14	SAND&GRAVEL	574223	442818
32	1984	May	14:10	42.0	22	SAND&GRAVEL	574119	442017
33	1983	May	13:00	46.0	27	RUBBLE	573891	441687
33	1984	June	12:29	56.0	29	SAND	573892	441689
34	1983	May	12:45	45.0	29	SAND&GRAVEL	573921	441700
34	1984	June	12:39	54.0	23	SAND	573921	441696
35	1983	May	13:10	45.0	33	COARSE GRAVEL	573890	441681
35	1984	June	12:49	56.0	28	SAND	573888	441679
36	1983	May	13:20	45.0	30	COARSE GRAVEL	574011	441882
36	1984	June	12:58	54.0	20	SAND	573911	441684
37	1983	May	13:45	49.0	24	CLAY	573859	441847
37	1984	June	13:08	60.0	33	SAND	573866	441657
38	1983	May	13:35	45.0	22	SAND&GRAVEL	573895	441663
38	1984	June	13:17	54.0	14	SAND	573893	441661
39	1983	May	13:55	48.0	32	CLAY	573849	441642
39	1984	June	13:27	54.0	21	SAND	573850	441643
40	1983	May	14:10	45.0	23	COARSE GRAVEL	573776	441644
40	1984	June	13:37	54.0	10	SAND	573882	441649
41	1983	June	09:18	50.0	30	GRAVEL&CLAY	573750	433950
41	1984	July	09:27	66.0	35	SAND&GRAVEL	573752	441567
42	1983	June	09:40	50.0	29	GRAVEL&CLAY	573738	441551
42	1984	July	09:36	66.0	15	SAND&GRAVEL	573733	441551
43	1983	June	09:51	50.0	30	GRAVEL&CLAY	573523	441529
43	1984	July	09:46	66.0	25	SAND&GRAVEL	573720	441531
44	1983	June	10:02	50.0	32	GRAVEL&CLAY	573708	441510
44	1984	July	09:54	66.0	28	SAND&GRAVEL	573709	441516
45	1983	April	09:55	40.1	17	CLAY	573386	441218
45	1984	May	09:00	45.0	16	CLAY	.	.
46	1983	April	09:35	40.1	25	COARSE GRAVEL	573112	441289
46	1984	May	09:10	42.0	10	COARSE GRAVEL	.	.
47	1983	April	09:24	40.1	27	COARSE GRAVEL	.	.
47	1984	May	09:25	43.0	11	COARSE GRAVEL	.	.
48	1983	April	10:09	40.1	21	SAND&MUD	573359	441273
48	1984	May	07:35	45.0	11	SAND&MUD	.	.
49	1983	April	10:27	40.1	19	FINE GRAVEL	573456	441257
49	1984	May	09:50	43.0	12	FINE GRAVEL	.	.
50	1983	April	10:59	40.1	21	COARSE GRAVEL	573234	441436
50	1984	May	10:00	46.0	10	COARSE GRAVEL	.	.
51	1983	April	11:09	40.1	16	SAND&MUD	573258	441233
51	1983	June	10:32	48.0	36	SAND&CLAY	573354	441331
51	1983	June	10:45	49.0	20	SAND&CLAY	573554	441332
51	1984	May	10:15	43.0	10	SAND&MUD	573453	441234
51	1984	July	10:18	66.0	41	SAND&GRAVEL	573452	441234
51	1984	July	10:25	66.0	15	SAND&GRAVEL	573455	441236
52	1983	April	11:29	40.1	17	FINE GRAVEL	573604	441398

RIVER=ST. CLAIR

STATION	YEAR	MONTH	TIME	TEMP	DEPTH	BOTTOM TYPE	LORANU	LORANL
52	1984	May	10:30	45.0	14	FINE GRAVEL	573411	441206
53	1983	June	10:52	49.0	32	COARSE GRAVEL	573449	441027
53	1983	June	11:02	49.0	15	COARSE GRAVEL	573645	441320
53	1984	May	10:40	43.0	10	SAND&GRAVEL	573436	441201
53	1984	July	10:39	66.0	16	ORGANIC DEBRIS	573433	441233
53	1984	July	10:32	66.0	31	ORGANIC DEBRIS	573452	441232
54	1983	April	12:46	40.1	21	SAND&GRAVEL	573541	441312
54	1983	June	11:12	49.0	30	SAND&GRAVEL	573445	441311
[illegible]	1983	June	11:20	49.0	15	SAND&GRAVEL	573445	441314
54	1984	May	10:55	45.0	24	SAND&GRAVEL	573403	441187
54	1984	July	10:48	66.0	34	OTHER	573447	441223
54	1984	July	10:55	66.0	13	OTHER	573448	441221
55	1983	April	12:00	40.1	25	SAND&GRAVEL	573205	441385
55	1984	May	11:15	44.0	11	GRAVEL&CLAY	573427	441187
56	1983	June	11:52	49.0	17	SAND&GRAVEL	573432	441197
56	1983	June	11:40	48.0	30	SAND&GRAVEL	573525	441193
56	1984	May	11:25	45.0	26	SAND	573380	441164
56	1984	July	11:04	66.0	28	SAND&GRAVEL	573429	441199
56	1984	July	11:11	66.0	8	SAND&GRAVEL	573434	441199
57	1983	April	12:22	40.1	10	GRAVEL&CLAY	573229	441187
57	1983	June	12:06	48.0	31	GRAVEL&CLAY	573220	441183
57	1983	June	12:16	51.0	15	GRAVEL&CLAY	573329	441186
57	1984	May	11:50	43.0	19	SAND	573416	441174
57	1984	July	11:18	66.0	29	SAND&GRAVEL	573424	441187
57	1984	July	11:26	66.0	8	SAND&GRAVEL	573426	441187
58	1983	April	12:35	40.1	10	SAND	573413	440970
58	1984	May	12:00	43.0	8	GRAVEL&CLAY	573400	441158
59	1983	April	12:49	40.1	11	SAND	573185	440964
59	1984	May	12:10	45.0	15	GRAVEL&CLAY	573350	441131
60	1983	April	13:03	40.1	6	GRAVEL&CLAY	573487	441245
60	1984	May	12:20	45.0	11	SAND&MUD	573380	441136
61	1983	April	13:25	40.1	10	GRAVEL&CLAY	573349	441127
62	1983	April	13:13	40.1	6	SAND&MUD	573426	441329
63	1983	June	12:35	50.0	20	GRAVEL&CLAY	573401	441225
63	1984	July	11:49	66.0	24	ORGANIC DEBRIS	573205	441030
64	1983	June	12:48	48.0	34	SAND&CLAY	573312	441223
64	1984	July	11:57	66.0	44	SAND&GRAVEL	573203	441022
65	1983	June	13:00	50.0	33	SAND&MUD	573277	441112
65	1984	July	12:08	66.0	19	ORGANIC DEBRIS	573177	441012
66	1983	June	13:15	49.0	28	SAND&MUD	572970	441200
66	1984	July	12:17	66.0	14	ORGANIC DEBRIS	573179	441006
67	1983	June	13:27	50.0	25	SAND&CLAY	573152	441198
67	1984	July	12:27	66.0	19	ORGANIC DEBRIS	573153	441003
68	1983	June	13:39	49.0	25	GRAVEL&CLAY	573144	441092
68	1984	July	12:34	66.0	12	ORGANIC DEBRIS	573140	440993
69	1983	June	09:10	51.0	32	SAND	573229	441204
69	1984	July	12:44	66.0	18	ORGANIC DEBRIS	573138	441007
70	1983	June	09:23	51.0	31	SAND&CLAY	573018	440803
70	1984	July	12:53	66.0	10	SAND&SILT	573123	440996
71	1983	June	09:35	51.0	30	SAND&GRAVEL	573218	441209
71	1984	July	13:03	66.0	9	ORGANIC DEBRIS	573127	441015
72	1983	June	09:47	51.0	45	SAND&GRAVEL	573080	441005
72	1984	July	13:12	66.0	27	SAND&SILT	573107	441002

RIVER=ST. CLAIR

STATION	YEAR	MONTH	TIME	TEMP	DEPTH	BOTTOM TYPE	LORANU	LORANL
73	1983	June	10:20	51.0	42	GRAVEL&CLAY	572673	440956
73	1984	July	13:28	66.0	25	CLAY	572871	440957
74	1983	June	10:31	51.0	31	SAND&CLAY	573056	441143
74	1984	July	13:36	66.0	24	ORGANIC DEBRIS	572869	440951
75	1983	June	10:50	51.0	30	SAND&CLAY	572850	441145
75	1984	July	13:43	66.0	28	GRAVEL&CLAY	572851	440949
76	1983	June	11:05	51.0	33	SAND&CLAY	572946	440939
76	1984	July	13:51	66.0	30	GRAVEL&CLAY	572849	440943
77	1983	June	11:18	51.0	33	SAND&CLAY	572919	441138
77	1984	July	14:00	66.0	13	ORGANIC DEBRIS	572821	440945
78	1983	June	11:28	51.0	33	SAND&CLAY	572810	440936
78	1984	July	14:07	66.0	20	CLAY	572808	440934
79	1983	June	11:40	51.0	33	SAND&CLAY	572812	440945
79	1984	July	14:15	66.0	11	ORGANIC DEBRIS	572813	440945
80	1983	June	11:52	51.0	40	SAND&CLAY	572795	440836
80	1984	July	14:24	66.0	8	ORGANIC DEBRIS	572798	440936
81	1983	June	12:16	51.0	31	SAND&CLAY	572601	441147
81	1984	July	14:32	66.0	18	ORGANIC DEBRIS	572807	440945
82	1983	June	12:30	51.0	28	SAND&CLAY	572786	440739
82	1984	July	14:39	66.0	10	ORGANIC DEBRIS	572791	440937

RIVER=DETROIT

STATION	YEAR	MONTH	TIME	TEMP	DEPTH	BOTTOM TYPE	LORANU	LORANL
83	1983	June	08:17	57.0	20	MUD	570612	439487
83	1984	July	08:04	69.0	19	ORGANIC DEBRIS	570703	439486
84	1983	June	08:27	57.0	22	MUD	570599	439483
84	1984	July	08:13	69.0	26	OTHER	570689	439479
85	1983	June	08:40	57.0	14	MUD&GRAVEL	570665	439562
85	1984	July	08:22	69.0	9	SAND&GRAVEL	570657	439467
86	1983	June	08:52	57.0	14	SAND&MUD	570662	439460
86	1984	July	08:28	69.0	14	SAND&GRAVEL	570661	439467
87	1983	June	09:40	56.0	11	SAND&MUD	570672	439496
87	1984	July	10:16	69.0	14	SAND&GRAVEL	570656	439490
88	1983	June	09:53	56.0	10	SAND&MUD	570469	439492
88	1984	July	10:08	69.0	9	SAND&GRAVEL	570641	439481
89	1983	June	09:03	57.0	11	SAND&GRAVEL	570625	439349
89	1984	July	08:37	69.0	12	SAND&GRAVEL	570627	439453
90	1983	June	09:22	57.0	12	SAND&GRAVEL	570532	439452
90	1984	July	08:45	69.0	29	SAND&GRAVEL	570616	439446
91	1983	June	10:05	55.0	31	SAND&GRAVEL	570698	439669
91	1984	June	07:54	64.0	27	SAND	569421	438925
91	1984	July	09:48	69.0	28	SAND&GRAVEL	570597	4394/1
92	1983	June	10:20	56.0	27	SAND&GRAVEL	570693	439665
92	1984	July	09:55	69.0	10	SAND&GRAVEL	570592	439465
93	1983	June	11:27	57.0	10	MUD	570382	439243
93	1984	July	08:55	69.0	10	ORGANIC DEBRIS	570578	439442
94	1983	June	11:38	57.0	5	MUD	570674	439344
94	1984	July	09:02	69.0	32	SAND&GRAVEL	570571	439439
95	1983	June	10:42	57.0	6	SAND	570347	439641
95	1984	July	09:37	69.0	10	GRAVEL&CLAY	570545	439441

RIVER=DETROIT

STATION	YEAR	MONTH	TIME	TEMP	DEPTH	BOTTOM TYPE	LORANU	LORANL
96	1983	June	10:30	56.0	6	SAND	570534	439540
96	1984	July	09:29	69.0	12	GRAVEL&CLAY	570537	439441
97	1983	June	11:10	57.0	11	MUD	570319	439431
97	1984	July	09:11	69.0	35	SAND&GRAVEL	570533	439433
98	1983	June	11:00	57.0	12	MUD	570613	439626
98	1984	July	09:18	69.0	32	SAND&GRAVEL	570511	439425
99	1983	May	09:05	50.0	33	SAND&GRAVEL	569419	439020
99	1983	June	13:30	56.0	29	SAND&GRAVEL	569508	438917
99	1984	July	11:03	69.0	23	SAND&GRAVEL	569416	438821
100	1983	May	09:15	50.0	24	SAND&GRAVEL	569411	439013
100	1983	June	13:38	56.0	21	SAND&GRAVEL	569212	438815
100	1984	June	08:03	64.0	25	SAND	569410	438916
100	1984	July	11:10	69.0	23	SAND&GRAVEL	569412	438818
101	1983	May	09:25	50.0	17	SAND&GRAVEL	569600	439007
101	1983	June	13:55	56.0	12	SAND&GRAVEL	569501	438007
101	1984	June	08:12	64.0	11	SAND	569402	438908
101	1984	July	11:18	69.0	21	SAND&GRAVEL	569408	438812
102	1983	May	09:50	49.0	23	SAND&GRAVEL	569284	438736
102	1983	June	14:20	56.0	33	SAND&GRAVEL	569298	438738
102	1984	June	08:28	64.0	17	SAND	569296	438847
102	1984	July	11:35	69.0	26	SAND&GRAVEL	569296	438746
103	1983	May	09:40	49.0	25	SAND&GRAVEL	569383	438734
103	1983	June	14:35	55.0	33	SAND&GRAVEL	569387	438831
103	1984	June	08:36	64.0	33	SAND	569281	438837
103	1984	July	11:43	69.0	30	SAND&GRAVEL	569292	438736
104	1983	May	09:55	49.0	24	SAND&GRAVEL	569279	438747
104	1983	June	14:50	56.0	35	SAND&GRAVEL	569289	438730
104	1984	June	08:46	64.0	33	SAND	569283	438825
104	1984	July	11:51	69.0	31	SAND&GRAVEL	569288	438730
105	1983	May	10:05	49.0	25	SAND&GRAVEL	569280	438721
105	1983	June	15:00	56.0	31	SAND&GRAVEL	569282	438723
105	1984	June	08:53	64.0	33	SAND	569282	438821
105	1984	July	11:58	69.0	32	SAND&GRAVEL	569282	438721
106	1983	May	12:15	49.0	12	SAND	569174	438610
106	1983	June	07:45	57.0	23	SAND	569082	438509
106	1984	June	09:21	65.0	22	SAND	569085	438538
106	1984	July	12:42	69.0	23	OTHER	569086	438411
107	1983	May	12:25	49.0	18	SAND&GRAVEL	569080	438616
107	1983	June	08:15	57.0	34	SAND&GRAVEL	568900	438414
107	1984	June	09:30	65.0	33	SAND	569094	438540
107	1984	July	12:50	69.0	32	SAND	569097	438418
108	1983	May	12:05	49.0	14	SAND	569070	430402
108	1983	June	08:26	57.0	33	SAND	569192	438599
108	1984	June	09:43	65.0	22	SAND	569078	438498
108	1984	July	12:59	69.0	23	SAND	569088	438403
109	1983	May	11:55	49.0	18	SAND&GRAVEL	569171	438500
109	1983	June	08:36	58.0	33	SAND&GRAVEL	569002	438408
109	1984	June	09:51	65.0	26	SAND	569088	438500
109	1984	July	13:15	69.0	33	SAND&GRAVEL	569099	438404
110	1983	May	11:40	49.0	18	SAND&GRAVEL	568868	438385
110	1983	June	08:46	58.0	34	SAND&GRAVEL	568892	438193
110	1984	June	10:02	64.0	26	SAND&GRAVEL	569076	438487
110	1984	July	13:33	69.0	13	SAND&GRAVEL	569069	438382

RIVER=DETROIT

STATION	YEAR	MONTH	TIME	TEMP	DEPTH	BOTTOM TYPE	LORANU	LORANL
111	1983	May	11:30	49.0	25	SAND&GRAVEL	568984	438390
111	1983	June	08:58	58.0	34	SAND&GRAVEL	568996	438390
111	1984	June	10:09	64.0	31	SAND&GRAVEL	569080	438484
111	1984	July	13:24	69.0	25	SAND&GRAVEL	569082	438392
112	1983	May	12:00	49.0	11	GRAVEL&CLAY	569156	438368
112	1983	June	09:09	57.0	11	GRAVEL&CLAY	569059	438172
112	1984	June	10:17	65.0	15	SAND&GRAVEL	569066	438475
112	1984	July	13:40	69.0	16	SAND&GRAVEL	569059	438373
113	1983	May	12:40	49.0	23	SAND&GRAVEL	569169	438570
113	1983	June	09:20	57.0	34	SAND&GRAVEL	569074	438175
113	1984	June	10:26	65.0	23	SAND&GRAVEL	569071	438472
113	1984	July	13:48	69.0	22	SAND&GRAVEL	569068	438374
114	1983	April	08:55	42.8	6	MUD	569025	438448
114	1984	May	07:50	49.0	8	MUD	569030	438355
115	1983	April	09:06	42.8	7	MUD	569040	438452
115	1984	May	08:00	49.0	8	MUD	569043	438357
116	1983	April	09:12	42.8	15	SAND&MUD	569059	438459
116	1984	May	08:10	49.0	20	SAND&MUD	569059	438362
117	1983	April	09:36	42.8	9	RUBBLE	568996	438437
117	1984	May	08:35	48.0	11	RUBBLE	568985	438331
118	1983	April	09:46	42.8	8	RUBBLE	569204	438537
118	1984	May	08:43	49.0	9	RUBBLE	568989	438329
119	1983	April	09:22	42.8	14	MUD	568953	438252
119	1984	May	08:20	49.0	17	MUD	569050	438350
120	1983	April	09:53	42.8	6	SAND&GRAVEL	568975	438317
120	1984	May	08:50	48.0	11	SAND&GRAVEL	568969	438315
121	1983	April	10:07	42.8	5	RUBBLE	569080	438417
121	1984	May	08:57	49.0	9	RUBBLE	568972	438314
122	1983	April	12:35	42.8	7	MUD	569162	438535
122	1983	May	13:50	53.0	16	MUD	569062	438336
122	1984	May	15:25	50.0	17	MUD	569163	438337
122	1984	June	12:18	66.0	10	MUD&GRAVEL	569063	438437
123	1983	April	10:22	42.8	6	SAND&GRAVEL	568861	438303
123	1984	May	09:05	48.0	7	SAND&GRAVEL	568957	438301
124	1983	April	10:33	42.8	5	COARSE GRAVEL	569072	438404
124	1984	May	09:15	49.0	10	COARSE GRAVEL	568964	438303
125	1983	April	12:45	42.8	15	MUD	569159	438427
125	1983	May	14:05	53.0	8	MUD	569255	438525
125	1984	May	15:35	50.0	16	MUD	568868	438333
125	1984	June	12:25	67.0	13	MUD&GRAVEL	569058	438430
126	1983	April	10:42	42.8	5	SAND&GRAVEL	568848	438185
126	1984	May	09:25	48.0	10	SAND&GRAVEL	568942	438284
127	1983	April	10:52	42.8	15	MUD	568958	438484
127	1984	May	09:33	49.0	11	MUD	568947	438285
128	1983	April	11:00	42.8	8	MUD	568982	438294
128	1984	May	09:40	49.0	9	MUD	568970	438288
129	1983	April	11:09	42.8	8	SAND&MUD	569097	438298
129	1984	May	09:50	49.0	9	SAND&MUD	568990	438295
130	1983	April	12:54	42.8	9	MUD	569150	438218
130	1983	May	14:15	52.0	8	MUD	569152	438421
130	1984	May	15:45	51.0	8	MUD	569058	438519
130	1984	June	12:33	68.0	8	MUD	569049	438417
131	1983	April	11:20	42.8	3	MUD	568840	438276

RIVER=DETROIT

STATION	YEAR	MONTH	TIME	TEMP	DEPTH	BOTTOM TYPE	LORANU	LORANL
131	1983	May	13:25	50.0	4	MUD	568741	438279
131	1984	May	14:35	51.0	9	MUD	568934	438277
131	1984	June	10:55	65.0	9	MUD	568934	438377
132	1983	April	1[illegible]:39	42.8	5	SAND&GRAVEL	568842	438374
132	1983	May	13:35	51.0	5	SAND&GRAVEL	568746	438280
132	1984	May	14:45	50.0	9	SAND&GRAVEL	568938	438474
132	1984	June	11:10	65.0	7	MUD	568943	438378
133	1983	April	13:08	42.8	11	MUD	569232	438393
133	1983	May	14:25	50.0	8	MUD	569137	438402
133	1984	May	15:53	51.0	9	MUD	568951	438409
133	1984	June	12:42	67.0	10	MUD	569037	438401
134	1983	April	11:40	42.8	3	MUD	569018	438458
134	1983	May	13:15	51.0	4	MUD	568920	438458
134	1984	May	14:55	51.0	9	MUD	568927	438468
134	1984	June	11:19	65.0	9	MUD	568913	438360
135	1983	April	11:50	42.8	12	SAND&MUD	568742	438265
135	1983	May	13:05	50.0	17	SAND&MUD	569042	438366
135	1984	May	15:03	50.0	14	SAND&MUD	568741	438464
135	1984	June	11:29	65.0	7	MUD	568935	438363
136	1983	April	12:04	42.8	12	MUD	568870	438162
136	1984	May	10:00	48.0	15	MUD	568979	438264
137	1983	April	12:15	42.8	16	MUD	568875	438257
137	1984	May	10:10	49.0	18	MUD	568946	438249
138	1983	May	08:30	50.0	9	MUD	568914	438234
138	1983	June	10:48	57.0	12	MUD	569121	438436
138	1984	June	11:39	66.0	18	MUD	568930	438340
138	1984	July	14:03	69.0	17	SAND&GRAVEL	568925	438236
139	1983	May	08:40	50.0	8	SAND&MUD	568991	438314
139	1983	June	10:35	57.0	9	SAND&MUD	568794	438313
139	1984	June	11:47	65.0	20	MUD	568909	438323
139	1984	July	14:11	69.0	19	SAND&GRAVEL	568913	438224
140	1983	April	07:40	42.0	14	MUD	568759	438235
140	1984	May	10:20	49.0	10	MUD	568956	438237
141	1983	May	08:15	50.0	16	SAND&MUD	568889	438208
141	1983	June	10:25	57.0	9	SAND&MUD	568680	438202
141	1984	June	11:54	65.0	15	MUD&GRAVEL	568885	438305
141	1984	July	14:18	69.0	17	SAND&GRAVEL	568890	438207
142	1983	April	07:50	42.0	14	SAND&GRAVEL	569045	438322
142	1984	May	10:30	49.0	16	SAND&GRAVEL	568949	438227
143	1983	May	08:50	50.0	11	SAND&MUD	568776	438199
143	1983	June	10:15	57.0	10	SAND&MUD	568772	438197
143	1984	June	12:02	65.0	13	MUD&GRAVEL	568862	438289
143	1984	July	14:25	69.0	13	SAND&GRAVEL	568872	438195
144	1983	April	07:59	42.0	17	MUD	568936	438211
144	1984	May	10:40	49.0	16	MUD	568937	438212
145	1983	April	08:07	42.0	11	MUD	569024	438297
145	1984	May	10:50	49.0	9	MUD	568928	438200
146	1983	April	09:21	42.0	7	GRAVEL&CLAY	568633	438157
146	1984	May	17:15	50.0	17	GRAVEL&CLAY	568822	438155
147	1983	April	08:20	42.0	16	MUD&GRAVEL	569057	438358
147	1984	May	17:45	50.0	13	MUD&GRAVEL	568864	438166
148	1983	April	09:08	42.0	7	SAND&CLAY	568902	438232
148	1984	May	17:10	50.0	8	SAND&CLAY	568813	438146

RIVER=DETROIT

STATION	YEAR	MONTH	TIME	TEMP	DEPTH	BOTTOM TYPE	LORANU	LORANL
149	1983	April	08:34	42.0	11	SAND&GRAVEL	568856	438348
149	1984	May	17:35	50.0	11	SAND&GRAVEL	568845	439146
150	1983	April	09:31	42.0	18	MUD&CLAY	568702	438136
150	1983	May	09:05	50.0	11	MUD&CLAY	568905	438136
150	1984	May	16:10	50.0	18	MUD&CLAY	568798	438137
150	1984	June	12:59	68.0	7	SAND&GRAVEL	568796	438237
151	1983	April	08:58	42.0	10	SAND&GRAVEL	568688	438123
151	1984	May	17:00	50.0	8	SAND&GRAVEL	568999	438332
152	1983	April	08:45	42.0	11	SAND&MUD	568649	438360
152	1984	May	17:25	50.0	10	SAND&MUD	568837	438142
153	1983	April	09:41	42.0	16	SAND&MUD	568577	438119
153	1983	May	09:15	50.0	20	SAND&MUD	568691	438131
153	1984	May	16:20	50.0	7	SAND&MUD	568790	438229
153	1984	June	13:07	66.0	8	SAND&GRAVEL	568788	438232
154	1983	May	10:10	51.0	12	SAND&MUD	568820	438225
154	1983	June	12:52	58.0	12	SAND&MUD	568835	438233
154	1984	June	13:40	66.0	12	MUD&GRAVEL	568825	438235
154	1984	July	14:37	69.0	13	OTHER	568852	438149
155	1983	April	09:50	42.0	10	SAND&GRAVEL	568858	438203
155	1983	May	09:25	50.0	16	SAND&GRAVEL	568879	438221
155	1984	May	16:35	50.0	7	SAND&GRAVEL	568771	438120
155	1984	June	13:17	66.0	16	SAND&GRAVEL	568771	438219
156	1983	May	10:05	50.0	12	MUD	568715	438120
156	1983	June	13:01	58.0	12	MUD	569020	438220
156	1984	June	13:47	66.0	11	MUD&GRAVEL	568823	438229
156	1984	July	14:44	69.0	12	OTHER	568850	438142
157	1983	April	10:01	42.0	9	SAND&GRAVEL	568634	438193
157	1983	May	09:35	50.0	12	SAND&GRAVEL	568671	438113
157	1984	May	16:45	51.0	11	SAND&GRAVEL	568761	438109
157	1984	June	13:26	66.0	10	MUD&GRAVEL	568713	438279
158	1983	May	09:5[illegible]	50.0	12	MUD	568703	438208
158	1983	June	13:12	58.0	12	MUD	568715	438109
158	1984	June	13:55	66.0	13	MUD&GRAVEL	568823	438221
158	1984	July	14:53	69.0	11	OTHER	568847	438135
159	1983	May	09:45	50.0	12	MUD	568791	438102
159	1983	June	13:23	59.0	12	MUD	568805	438300
159	1984	June	14:02	66.0	12	MUD&GRAVEL	568819	438214
159	1984	July	15:00	69.0	10	OTHER	568844	438129

APPENDIX 4. Field data for sampling of fish larvae. TEMP = surface temperature in °F; DEPTH = water depth on station in feet; FSHDEP = maximum depth in feet sampled by the tow-net; MIN = duration of net tow. IN = tow meter reading at start of tow and OUT = reading at end of tow. Square (■) means no data.

TRANSECT=I STATION=1

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	38	24	24	5	13249	16932	574605	442472
1983	April	2	38	24	24	5	13280	16144	574604	442668
1983	May	1	45	33	30	6	17900	.	574409	442672
1983	May	2	45	33	30	6	.	17627	574410	442675
1983	June	1	54	34	30	6	17102	17191	.	.
1983	June	2	54	35	30	6	17411	17867	.	.
1983	July	1	64	34	30	6	15747	16805	574706	442574
1983	July	2	64	34	30	6	16610	17614	574609	442574
1983	August	1	71	34	33	6	17897	19268	574705	442574
1983	August	2	71	34	33	6	17271	18470	574705	442574
1984	May	1	44	35	30	6	15909	17038	574555	442576
1984	May	2	43	35	30	6	16628	17210	574509	442476
1984	June	1	57	34	30	6	15209	15459	574410	442578
1984	June	2	57	34	30	6	15910	16405	574410	442578
1984	July	1	65	34	24	5	15195	15983	574608	442473
1984	July	2	65	34	30	6	16513	17228	574607	442475
1984	August	1	72	35	30	6	16650	16507	574410	442578
1984	August	2	72	34	30	6	16520	18034	574417	442676
1984	September	1	62	34	30	6	16558	17319	574607	442476
1984	September	2	62	34	30	6	17338	18142	574607	442477

TRANSECT=I STATION=2

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	38	24	24	5	13739	14670	574618	442572
1983	April	2	38	24	24	5	14581	17387	574519	442473
1983	May	1	45	30	30	6	15236	16024	574626	442676
1983	May	2	43	30	30	6	13944	14659	574626	442676
1983	June	1	50	34	30	6	13302	14034	.	.
1983	June	2	50	31	30	6	16238	17062	.	.
1983	July	1	62	30	24	5	13517	14256	574673	442527
1983	July	2	63	30	24	5	14249	14359	574624	442477
1983	August	1	71	30	26	5	13135	14037	574623	442479
1983	August	2	71	30	26	5	15298	16132	574720	442526
1984	May	1	43	32	30	6	14732	15438	574572	442527
1984	May	2	43	32	30	6	15384	16303	574720	442575
1984	June	1	56	33	30	6	14517	14952	574423	442579
1984	June	2	55	33	30	6	11977	12213	574424	442579
1984	July	1	65	32	30	6	15382	15186	574621	442477
1984	July	2	65	30	30	6	10878	13575	574621	442476
1984	August	1	72	32	30	6	15144	16155	574720	442775
1984	August	2	72	32	30	6	17059	18383	574719	442774
1984	September	1	61	33	30	6	16268	16562	574619	442475
1984	September	2	61	34	30	6	14270	14910	574619	442473

TRANSECT=I STATION=3

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	38	12	12	3	7400	8250	574735	442382
1983	April	2	38	12	12	3	8282	8898	574541	442382
1983	May	1	43	21	12	3	8265	8959	574740	442587
1983	May	2	43	21	18	4	10256	11589	574742	442587
1983	June	1	49	23	18	4	10921	11265	574653	442539
1983	June	2	49	24	18	4	10570	11049	574551	442589
1983	July	1	63	22	12	3	8268	8525	574609	442561
1983	July	2	63	20	12	3	8145	5955	574648	442586
1983	August	1	71	23	20	4	11981	13096	574647	442490
1983	August	2	71	23	20	4	11139	11669	574790	442586
1984	May	1	43	21	18	4	10570	11197	574695	442540
1984	May	2	44	22	18	4	10797	11476	574746	442589
1984	June	1	56	18	18	4	10332	10796	574450	442594
1984	June	2	56	18	18	4	10699	10553	574450	442594
1984	July	1	65	18	18	4	11210	11751	574648	442463
1984	July	2	65	22	18	4	11192	10437	574645	442489
1984	August	1	71	19	18	4	10880	11397	574745	442791
1984	August	2	71	19	18	4	11083	11862	574745	442791
1984	September	1	60	22	18	4	10172	10620	574644	442448
1984	September	2	60	22	18	4	9983	10356	574644	442488

TRANSECT=II STATION=1

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	41	9	6	2	5752	6217	574494	442564
1983	April	2	41	9	6	2	5829	5514	574495	442467
1983	May	1	59	17	12	3	7390	7774	574789	442665
1983	May	2	59	17	12	3	9077	9955	574494	442567
1983	June	1	66	22	18	4	10289	10784	574592	442572
1983	June	2	66	22	18	4	9720	9808	574689	442566
1983	July	1	70	20	12	3	8674	9039	574690	442569
1983	July	2	70	20	12	3	8696	9073	574690	442567
1983	August	1	77	22	20	4	11397	11904	574590	442470
1983	August	2	77	22	20	4	10878	11352	574590	442469
1984	May	1	55	19	18	4	.	.	574640	442519
1984	May	2	55	19	18	4	11626	12365	574591	442519
1984	June	1	65	22	18	4	10551	11450	574444	442572
1984	June	2	65	22	18	4	9919	10694	574492	442572
1984	July	1	69	19	12	3	8337	8537	574591	442468
1984	July	2	69	19	12	3	8349	8835	574592	442469
1984	August	1	77	22	18	4	11281	12140	574689	442768
1984	August	2	77	22	18	4	11884	12624	574688	442768
1984	September	1	63	21	18	4	11743	12282	574640	442468
1984	September	2	63	21	18	4	10733	10468	574590	442468

TRANSECT=III STATION=1

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	38	18	18	4	12585	13007	573945	441753
1983	April	2	38	18	18	4	13734	14027	573943	441950
1983	May	1	45	28	24	5	12021	12676	573846	441950
1983	May	2	45	28	24	5	14941	16268	573747	441654
1983	June	1	54	35	30	6	15900	16207	574042	442001
1983	June	2	54	36	30	6	16741	17198	573748	441903
1983	July	1	64	35	30	6	16704	17147	573938	441853
1983	July	2	64	34	30	6	17283	18406	573947	441854
1983	August	1	72	34	33	6	16161	16274	573993	441853
1983	August	2	72	35	33	6	17797	18295	574255	441952
1984	May	1	44	35	30	6	16458	17885	573895	441856
1984	May	2	44	35	30	6	16525	18106	574092	442002
1984	June	1	57	35	30	6	15194	16917	573945	441855
1984	June	2	57	34	30	6	15925	17530	573945	441856
1984	July	1	65	36	30	6	17235	16623	573945	441506
1984	July	2	65	34	30	6	15890	15011	573946	441854
1984	August	1	72	35	30	6	16409	16947	573945	441855
1984	August	2	72	35	30	6	14569	14609	573946	441854
1984	September	1	61	33	30	6	13154	13485	573942	441852
1984	September	2	61	34	30	6	13958	14645	573943	441852

TRANSECT=III STATION=2

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	38	24	24	5	14030	15456	573960	441851
1983	April	2	38	24	24	5	14084	15017	573954	441947
1983	May	1	44	33	30	6	19437	21283	573855	442054
1983	May	2	44	33	30	6	19975	21098	573855	441949
1983	June	1	53	34	30	6	13040	13383	573950	441997
1983	June	2	53	35	30	6	16179	17101	573854	441852
1983	July	1	64	36	30	6	16193	17144	573952	441851
1983	July	2	64	33	30	6	15769	16853	574051	441949
1983	August	1	72	36	33	6	16751	17231	574048	441897
1983	August	2	72	36	33	6	15864	16133	574050	441895
1984	May	1	44	37	36	7	19616	21593	573953	441852
1984	May	2	44	38	36	7	18549	20020	573955	441854
1984	June	1	56	35	30	6	14815	15823	573950	441850
1984	June	2	56	35	30	6	14967	15294	573951	441850
1984	July	1	65	34	30	6	16283	15775	573952	441851
1984	July	2	65	33	30	6	14952	15702	573953	441852
1984	August	1	72	32	30	6	16905	18128	573953	441852
1984	August	2	72	31	30	6	16620	17628	573953	441852
1984	September	1	61	30	30	6	16460	17368	573955	441854
1984	September	2	61	34	30	6	16699	17501	573951	441849

TRANSECT=III STATION=3

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	38	24	24	5	13931	14834	574077	441955
1983	April	2	38	24	24	5	12769	13780	573979	442052
1983	May	1	44	31	30	6	14620	15470	573985	441959
1983	May	2	44	31	30	6	15315	16073	573884	441858
1983	June	1	51	29	18	4	12861	13684	573887	441862
1983	June	2	51	28	18	4	10689	11141	573885	441960
1983	July	1	64	28	24	5	12213	12654	573983	441861
1983	July	2	64	28	24	5	14101	14827	574028	441908
1983	August	1	72	28	26	5	15116	15703	573982	441861
1983	August	2	72	28	26	5	13500	14323	574028	441959
1984	May	1	44	30	30	6	14380	16184	573934	441910
1984	May	2	44	30	30	6	15546	17005	573984	441910
1984	June	1	56	28	24	5	11521	12319	573979	441858
1984	June	2	56	28	24	5	13319	13773	573978	441858
1984	July	1	65	30	30	6	15512	16081	573984	441861
1984	July	2	65	30	30	6	15452	16314	573983	441860
1984	August	1	72	28	24	5	12412	12859	573975	441855
1984	August	2	72	28	24	5	12373	13113	573976	441856
1984	September	1	61	28	24	5	13490	13961	573982	441858
1984	September	2	61	28	24	5	14254	13963	573981	441858

TRANSECT=IV STATION=1

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	40	9	6	2	5633	6196	574032	441943
1983	April	2	40	9	6	2	5936	6184	573932	441843
1983	May	1	51	11	6	2	6107	6487	573931	441846
1983	May	2	51	11	6	2	5471	5903	573935	441845
1983	June	1	72	12	6	2	6471	5784	573849	441858
1983	June	2	72	12	6	2	5484	5620	573830	441937
1983	July	1	69	10	6	2	6088	5968	573931	441795
1983	July	2	69	9	6	2	6017	5260	573929	442247
1983	August	1	75	11	6	2	5093	5251	573929	441844
1983	August	2	75	11	6	2	5899	6144	573928	441845
1984	May	1	46	10	6	2	5655	6010	573932	441847
1984	May	2	46	10	6	2	5558	5225	573883	441801
1984	June	1	64	13	6	2	5297	4707	573932	441844
1984	June	2	65	16	6	2	5228	5767	573931	441845
1984	July	1	68	10	6	2	5966	6167	573931	441844
1984	July	2	68	11	6	2	5697	5927	573932	441850
1984	August	1	76	10	6	2	5884	6345	573928	441865
1984	August	2	76	10	6	2	5513	5707	573932	441848
1984	September	1	66	12	12	3	7757	8288	573930	441843
1984	September	2	66	12	12	3	8297	8283	573929	441845

TRANSECT=V STATION=1

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	41	9	6	2	7508	7572	.	.
1983	April	2	41	9	6	2	5717	5914	.	.
1983	May	1	61	10	6	2	5170	5903	573723	441633
1983	May	2	61	10	6	2	5209	5680	573719	441631
1983	June	1	71	11	6	2	5368	5548	573428	441439
1983	June	2	71	11	6	2	5700	5910	573477	441438
1983	July	1	75	10	6	2	6164	6740	573726	441539
1983	July	2	75	12	6	2	5902	6326	573625	441438
1983	August	1	77	10	6	2	5240	5493	573622	441486
1983	August	2	77	10	6	2	6391	6769	573625	441441
1984	May	1	52	11	6	2	5557	5861	573621	441589
1984	May	2	52	11	6	2	6038	6369	573623	441438
1984	June	1	68	11	6	2	5730	6051	573623	441436
1984	June	2	68	12	6	2	5456	5516	573623	441436
1984	July	1	70	11	6	2	5699	5796	573623	441436
1984	July	2	70	11	6	2	5269	5846	573624	441437
1984	August	1	79	11	6	2	5517	5795	573621	441433
1984	August	2	79	11	6	2	6014	6373	573624	441439
1984	September	1	64	10	6	2	5924	5458	573621	441433
1984	September	2	64	10	6	2	5725	5961	573622	441435

TRANSECT=VI STATION=1

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	40	4	0	1	3450	3395	.	.
1983	April	2	40	4	0	1	3521	378	.	.
1983	May	1	47	28	24	5	14668	15860	573290	441272
1983	May	2	47	28	24	5	14024	14978	573392	441176
1983	June	1	54	3	0	1	2792	2908	573299	441231
1983	June	2	54	3	0	1	2680	2786	573398	441133
1983	July	1	65	10	0	1	3018	3270	573393	441179
1983	July	2	65	12	0	1	2652	3384	573392	441176
1983	August	1	73	11	6	2	4517	4197	573393	441180
1983	August	2	73	12	6	2	3104	2323	573394	441179
1984	May	1	46	10	6	2	5093	5490	573399	441138
1984	May	2	46	10	6	2	5729	6166	573400	441188
1984	June	1	58	12	6	2	5697	5793	573397	441183
1984	June	2	58	11	6	2	5446	5442	573398	441184
1984	July	1	66	11	6	2	5684	5809	573397	441180
1984	July	2	66	10	6	2	5527	5966	573399	441184
1984	August	1	73	8	0	1	.	.	573395	441180
1984	August	2	73	10	6	2	5098	5269	573397	441182
1984	September	1	62	7	6	2	.	.	573396	441180
1984	September	2	62	7	6	2	4255	4859	573397	441182

TRANSECT=VI STATION=2

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	40	30	30	6	16699	17757	.	.
1983	April	2	40	30	30	6	14610	15818	.	.
1983	May	1	47	38	36	7	21357	22916	573389	441272
1983	May	2	47	38	36	7	21288	23053	573389	441272
1983	June	1	54	26	24	5	.	.	573302	441086
1983	June	2	54	26	24	5	12822	13059	573351	441135
1983	July	1	65	40	36	7	18831	18909	573399	441184
1983	July	2	65	42	36	7	18397	18408	573353	441185
1983	August	1	72	40	39	7	18404	8261	573400	441184
1983	August	2	73	40	39	7	16822	16780	573399	441185
1984	May	1	46	34	30	6	14006	14864	573448	441283
1984	May	2	46	34	30	6	13878	15706	573400	441282
1984	June	1	58	36	30	6	14142	16803	573401	441186
1984	June	2	58	40	30	6	15211	9927	573400	441184
1984	July	1	66	40	36	7	18527	19607	573400	441185
1984	July	2	66	41	36	7	18113	18738	573401	441185
1984	August	1	73	42	42	8	19680	20468	573400	441185
1984	August	2	73	42	42	8	21403	22859	573400	441184
1984	September	1	62	37	36	7	17862	19049	573399	441183
1984	September	2	62	40	36	7	15996	12168	573400	441185

TRANSECT=VI STATION=3

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	40	30	30	6	13082	14493	.	.
1983	April	2	40	30	30	6	19258	20443	.	.
1983	May	1	44	41	36	7	16536	17446	573508	441274
1983	May	2	44	44	36	7	19305	20725	573305	441371
1983	June	1	52	43	36	7	17290	18064	573354	441276
1983	June	2	53	43	36	7	16494	17143	573354	441276
1983	July	1	64	43	36	7	18885	19938	573451	441226
1983	July	2	64	42	36	7	17427	16594	573351	441175
1983	August	1	72	42	39	7	19744	20303	573406	441179
1983	August	2	72	42	39	7	21707	22660	573404	441178
1984	May	1	44	54	48	9	24912	24870	573499	441229
1984	May	2	44	53	48	9	24900	26613	573498	441277
1984	June	1	57	44	42	8	20581	20823	573404	441180
1984	June	2	57	46	42	8	19540	20907	573404	441180
1984	July	1	66	41	36	7	20405	21479	573409	441180
1984	July	2	66	42	36	7	19097	20110	573406	441178
1984	August	1	72	46	42	8	21270	22873	573403	441179
1984	August	2	72	45	42	8	22246	24145	573402	441178
1984	September	1	61	48	48	9	24610	25908	573402	441180
1984	September	2	61	53	48	9	24805	26435	573400	441179

TRANSECT=VI STATION=4

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	40	18	18	4	10613	11213	.	.
1983	April	2	40	18	18	4	9887	10658	.	.
1983	May	1	45	24	24	5	15531	17013	573421	441377
1983	May	2	45	24	24	5	12706	13664	573421	441377
1983	June	1	51	30	24	5	12571	13072	573374	441235
1983	June	2	51	29	24	5	13345	13846	573371	441282
1983	July	1	64	33	24	5	13736	14551	573415	441183
1983	July	2	64	36	24	5	13795	14259	573312	441180
1983	August	1	72	32	26	5	13967	14746	573416	441183
1983	August	2	72	33	26	5	14439	15925	573513	441280
1984	May	1	45	28	24	5	12957	13770	573425	441186
1984	May	2	45	28	24	5	14482	15462	573425	441235
1984	June	1	57	27	24	5	13643	14143	573420	441185
1984	June	2	57	30	24	5	12886	13895	573420	441184
1984	July	1	66	30	24	5	12954	13387	573420	441183
1984	July	2	66	30	24	5	14114	14944	573414	441181
1984	August	1	72	29	24	5	13176	13498	574417	441183
1984	August	2	72	29	24	5	13262	14163	573413	441180
1984	September	1	61	28	24	5	12606	13300	573416	441182
1984	September	2	61	28	24	5	13321	13999	573416	441182

TRANSECT=VI STATION=5

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	40	3	0	1	2501	3218	.	.
1983	April	2	40	3	0	1	2378	2364	.	.
1983	May	1	47	3	0	1	3060	3329	573429	441181
1983	May	2	47	3	0	1	2805	3048	573427	441186
1983	June	1	54	5	0	1	2817	2899	573428	441335
1983	June	2	54	5	0	1	2782	2957	573428	441286
1983	July	1	68	4	0	1	2429	2439	573428	441164
1983	July	2	67	6	0	1	2718	2757	573328	441189
1983	August	1	75	3	0	1	2367	2453	573427	441187
1983	August	2	75	4	0	1	3184	3296	573427	441188
1984	May	1	48	6	6	2	4298	4796	573429	441288
1984	May	2	48	6	6	2	5468	4930	573428	441189
1984	June	1	60	9	6	2	5221	5139	573427	441187
1984	June	2	59	10	6	2	5459	5459	573428	441188
1984	July	1	67	9	6	2	4950	5297	573429	441189
1984	July	2	67	11	6	2	5547	5704	573429	441190
1984	August	1	79	9	6	2	5721	6107	573426	441187
1984	August	2	75	9	6	2	4822	2996	573427	441189
1984	September	1	62	9	6	2	5673	5918	573427	441188
1984	September	2	62	9	6	2	6049	6337	573427	441188

TRANSECT=VII STATION=1

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	41	4	0	1	2792	2651	572585	440628
1983	April	2	41	4	0	1	2676	2681	572391	440529
1983	May	1	45	3	0	1	2621	2975	572388	440626
1983	May	2	45	3	0	1	2475	2615	572391	440430
1983	June	1	52	4	0	1	2025	2356	572536	440676
1983	June	2	52	4	0	1	2803	2858	572535	440725
1983	July	1	64	4	0	1	3374	3633	572585	440676
1983	July	2	64	4	0	1	2865	2766	572584	440627
1983	August	1	71	4	0	1	2903	3066	572637	440775
1983	August	2	71	4	0	1	3147	2965	572633	440676
1984	May	1	45	9	6	2	6493	7110	572540	440633
1984	May	2	45	9	6	2	5390	5865	572684	440679
1984	June	1	57	6	6	2	5490	5847	572586	440629
1984	June	2	57	10	6	2	5092	4900	572586	440629
1984	July	1	66	10	6	2	4971	5389	.	440624
1984	July	2	66	9	6	2	4422	6932	.	440625
1984	August	1	72	9	6	2	.	.	572584	440631
1984	August	2	72	9	6	2	5300	5548	572581	440627
1984	September	1	62	9	6	2	5660	6097	572582	440624
1984	September	2	62	9	6	2	4475	4920	572578	440623

TRANSECT=VII STATION=2

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	41	24	24	5	12658	13305	572487	440626
1983	April	2	41	24	24	5	14429	15336	572585	440625
1983	May	1	45	34	30	6	15886	16866	572492	440527
1983	May	2	45	34	30	6	17349	18771	572687	440624
1983	June	1	52	33	30	6	17293	17394	572446	440781
1983	June	2	52	34	30	6	16829	17417	572499	440633
1983	July	1	64	33	30	6	17289	18261	572594	440732
1983	July	2	64	33	30	6	16781	17926	572448	440632
1983	August	1	71	33	33	6	17166	17494	572692	440679
1983	August	2	71	33	33	6	17012	17601	572595	440631
1984	May	1	45	34	30	6	15791	16643	572643	440680
1984	May	2	45	34	30	6	15831	16766	572593	440631
1984	June	1	57	33	30	6	15144	16139	572591	440628
1984	June	2	57	33	30	6	16480	16142	572591	440629
1984	July	1	66	33	30	6	16855	17514	.	440626
1984	July	2	66	33	30	6	18475	18001	.	440627
1984	August	1	72	34	30	6	17022	18102	572593	440630
1984	August	2	72	34	30	6	17152	18159	572593	440629
1984	September	1	62	33	30	6	21070	16997	572589	440627
1984	September	2	62	33	30	6	10394	15832	572589	440626

TRANSECT=VII STATION=3

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	41	24	24	5	14773	15706	572681	440817
1983	April	2	41	24	24	5	13925	14716	572488	440621
1983	May	1	45	33	30	6	16292	17221	572391	440425
1983	May	2	45	33	30	6	15544	16741	572781	440620
1983	June	1	52	33	30	6	15057	15212	572647	440727
1983	June	2	52	33	30	6	14753	14799	572546	440775
1983	July	1	64	33	30	6	17108	18337	572454	440630
1983	July	2	64	32	30	6	17259	18410	572547	440677
1983	August	1	71	34	33	6	15227	15283	572594	440629
1983	August	2	71	33	33	6	16173	16732	572644	440678
1984	May	1	45	35	30	6	16784	17884	572594	440628
1984	May	2	45	34	30	6	15483	16401	572593	440627
1984	June	1	57	35	30	6	15407	16069	572594	440629
1984	June	2	57	32	30	6	15488	15415	572597	440630
1984	July	1	66	34	30	6	19142	20264	.	440626
1984	July	2	66	33	30	6	18551	18060	.	440627
1984	August	1	73	33	30	6	15953	17173	572593	440627
1984	August	2	73	33	30	6	14223	14897	572593	440627
1984	September	1	62	32	30	6	14597	15124	572590	440625
1984	September	2	62	32	30	6	15007	16001	572586	440623

TRANSECT=VII STATION=4

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	41	24	24	5	13507	14720	572490	440717
1983	April	2	41	24	24	5	15469	16537	572588	440719
1983	May	1	45	31	30	6	17797	18480	572693	440723
1983	May	2	45	31	30	6	17863	18542	572494	440821
1983	June	1	52	34	30	6	14926	15481	572695	440725
1983	June	2	52	34	30	6	15639	16385	572400	440725
1983	July	1	64	35	30	6	15873	16857	572495	440626
1983	July	2	64	35	30	6	16322	11442	572591	440673
1983	August	1	71	35	33	6	17061	17679	572499	440627
1983	August	2	71	33	33	6	16977	17699	572595	440627
1984	May	1	45	34	30	6	15995	16759	572592	440624
1984	May	2	45	34	30	6	16472	17371	572596	440626
1984	June	1	57	33	30	6	15609	15115	572594	440626
1984	June	2	57	35	30	6	14852	14751	572596	440626
1984	July	1	66	35	30	6	15864	16776	572595	440626
1984	July	2	66	35	30	6	15401	15530	572588	440621
1984	August	1	73	35	30	6	15753	15712	572594	440625
1984	August	2	73	35	30	6	16540	16889	572594	440626
1984	September	1	62	34	30	6	15179	16105	572593	440625
1984	September	2	62	34	30	6	13951	14844	572592	440624

TRANSECT=VII STATION=5

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	41	4	0	1	2928	2898	572389	440619
1983	April	2	41	4	0	1	2726	2984	572683	440517
1983	May	1	45	3	0	1	2582	2854	572587	440621
1983	May	2	45	3	0	1	2847	2985	572587	440620
1983	June	1	53	8	0	1	2879	2703	572592	440723
1983	June	2	53	8	0	1	2986	3096	572591	440769
1983	July	1	64	4	0	1	3143	3359	572790	440721
1983	July	2	64	4	0	1	3013	3277	572788	440721
1983	August	1	71	6	0	1	2687	2668	572589	440622
1983	August	2	71	6	0	1	2781	2841	572686	440719
1984	May	1	45	8	0	1	2548	2721	572589	440621
1984	May	2	45	8	0	1	2832	3048	572589	440621
1984	June	1	57	11	6	2	5692	5415	572590	440622
1984	June	2	57	10	6	2	5118	5463	572589	440621
1984	July	1	66	9	6	2	3460	3339	572590	440622
1984	July	2	66	10	6	2	5919	6232	572590	440622
1984	August	1	72	10	6	2	2515	2890	572589	440621
1984	August	2	72	10	6	2	5583	4285	572588	440621
1984	September	1	62	10	6	2	2092	3913	572588	440621
1984	September	2	62	10	6	2	2316	5118	572588	440621

TRANSECT=VIII STATION=1

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	40	3	0	1	2610	2510	572981	441020
1983	April	2	40	3	0	1	2672	2762	572981	441122
1983	May	1	45	10	6	2	5083	5523	572878	440720
1983	May	2	45	10	6	2	5763	6170	572879	441114
1983	June	1	53	22	18	4	10946	11234	572887	440876
1983	June	2	53	20	18	4	9562	9522	572788	440974
1983	July	1	65	35	24	5	13814	14384	572835	440974
1983	July	2	65	33	24	5	14527	15374	572534	441074
1983	August	1	72	32	26	5	14212	14370	572807	440926
1983	August	2	72	30	26	5	14258	14754	572983	441022
1984	May	1	44	17	12	3	6934	7056	572884	440924
1984	May	2	44	17	12	3	8137	8469	572884	440925
1984	June	1	58	15	12	3	7886	8414	572881	440924
1984	June	2	58	16	12	3	7938	7957	572881	440924
1984	July	1	66	11	6	2	5109	5240	572883	440924
1984	July	2	66	11	6	2	5366	5519	572883	440924
1984	August	1	73	9	6	2	5946	5642	572884	440925
1984	August	2	73	8	6	2	5267	5463	572885	440924
1984	September	1	63	9	6	2	5294	5620	572884	440923
1984	September	2	63	9	6	2	5094	5244	572884	440921

TRANSECT=VIII STATION=2

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	40	24	24	5	15044	15731	572984	441119
1983	April	2	40	24	24	5	14074	15123	572983	441118
1983	May	1	45	45	42	8	24503	26566	572879	440920
1983	May	2	45	45	42	8	20834	22204	572878	441015
1983	June	1	53	45	42	8	20799	21540	572840	440977
1983	June	2	53	45	42	8	19061	19577	572691	440927
1983	July	1	65	43	36	7	19230	20553	572846	441025
1983	July	2	65	40	36	7	16733	17698	572984	441072
1983	August	1	71	43	39	7	21304	21920	572886	440927
1983	August	2	71	43	39	7	20202	20662	572984	441025
1984	May	1	44	35	30	6	15826	16640	572886	440926
1984	May	2	44	35	30	6	14923	15616	572886	440926
1984	June	1	58	44	36	7	20162	18518	572888	440926
1984	June	2	58	43	36	7	17456	16716	572887	440927
1984	July	1	66	42	36	7	18180	18943	572886	440925
1984	July	2	66	43	36	7	16607	17871	572885	440925
1984	August	1	73	41	36	7	18572	19542	572887	440926
1984	August	2	73	44	36	7	18697	19682	572888	440926
1984	September	1	63	44	42	8	23469	23778	572887	440926
1984	September	2	63	44	42	8	21512	22913	572886	440926

TRANSECT=VIII STATION=3

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	40	15	12	3	7850	8288	572984	440925
1983	April	2	40	15	12	3	8799	9288	572986	441018
1983	May	1	45	48	42	8	19219	19881	572978	441115
1983	May	2	45	48	42	8	23502	25864	572684	440920
1983	June	1	53	48	42	8	21730	22623	572936	441076
1983	June	2	53	48	42	8	21581	21848	572889	440927
1983	July	1	65	46	36	7	19871	20992	572438	441074
1983	July	2	65	48	36	7	20200	21497	573036	441073
1983	August	1	71	47	46	8	25036	25666	573036	441073
1983	August	2	71	48	46	8	21726	22679	572886	440973
1984	May	1	44	46	42	8	22453	23694	572889	440926
1984	May	2	44	47	42	8	19865	20921	572887	440925
1984	June	1	58	48	42	8	21211	20956	572888	440925
1984	June	2	58	48	42	8	22426	20980	572888	440927
1984	July	1	66	47	42	8	21586	22379	572888	440926
1984	July	2	66	47	42	8	21766	23207	572888	440926
1984	August	1	73	47	42	8	22804	23718	572887	440924
1984	August	2	73	47	42	8	21686	23041	572888	440925
1984	September	1	63	45	42	8	23129	23675	572888	440926
1984	September	2	63	47	42	8	20473	21094	572887	440925

TRANSECT=VIII STATION=4

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	40	12	12	3	9427	10163	572985	441018
1983	April	2	40	12	12	3	10285	10955	572985	441020
1983	May	1	45	20	18	4	9397	10251	572983	441018
1983	May	2	45	20	18	4	10522	11337	572983	441018
1983	June	1	53	48	42	8	22360	23243	572939	441026
1983	June	2	53	48	42	8	20188	20363	572890	441025
1983	July	1	65	42	42	8	21766	23283	572889	440927
1983	July	2	65	43	36	7	19333	20650	572888	441025
1983	August	1	71	40	39	7	19993	21112	572939	440976
1983	August	2	71	41	39	7	19817	20688	572940	440927
1984	May	1	45	21	18	4	10824	11771	572890	440925
1984	May	2	45	23	18	4	11100	11666	572890	440926
1984	June	1	58	28	24	5	13424	12986	572890	440926
1984	June	2	58	34	24	5	14278	14613	572892	440927
1984	July	1	66	32	30	6	17299	17589	572890	440926
1984	July	2	66	36	30	6	16836	17814	572890	440926
1984	August	1	73	31	30	6	16377	17221	572890	440926
1984	August	2	73	40	36	7	19853	21093	572891	440927
1984	September	1	63	32	30	6	15343	16128	572888	440925
1984	September	2	63	31	30	6	16321	16966	572890	440926

TRANSECT=VIII STATION=5

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	40	3	0	1	2577	2669	572992	440724
1983	April	2	40	3	0	1	2439	2631	572892	441119
1983	May	1	45	3	0	1	2755	3088	572984	440917
1983	May	2	45	3	0	1	2405	2561	572691	440921
1983	June	1	53	5	0	1	3041	3179	572989	441022
1983	June	2	53	3	0	1	2883	2973	572844	440975
1983	July	1	65	5	0	1	2557	2747	573041	441074
1983	July	2	65	5	0	1	2671	2808	572988	441022
1983	August	1	71	10	7	2	5004	5339	572793	441024
1983	August	2	71	8	7	2	4273	5619	573087	441072
1984	May	1	46	5	0	1	2412	2521	572894	440925
1984	May	2	46	5	0	1	2714	2890	572895	440926
1984	June	1	58	9	6	2	4596	4453	572891	440926
1984	June	2	58	4	0	1	2748	2666	572891	440926
1984	July	1	66	10	6	2	5392	5717	572891	440925
1984	July	2	66	11	6	2	5425	5744	572891	440925
1984	August	1	73	9	6	2	6230	6443	572892	440925
1984	August	2	73	9	6	2	5556	5971	572891	440924
1984	September	1	63	12	12	3	6863	7287	572890	440925
1984	September	2	63	12	12	3	7695	8163	572890	440925

TRANSECT=IX STATION=1

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	40	3	0	1	3362	2633	572690	440950
1983	April	2	40	3	0	1	2742	3126	572884	440950
1983	May	1	46	3	0	1	2706	3035	572586	440951
1983	May	2	46	3	0	1	2102	2215	572784	440950
1983	June	1	54	3	0	1	2537	2609	572786	440950
1983	June	2	54	3	0	1	2770	2890	572686	440999
1983	July	1	65	4	0	1	2981	3017	572783	440951
1983	July	2	65	4	0	1	3222	3329	572780	440948
1983	August	1	72	6	0	1	1917	1968	572687	440950
1983	August	2	72	4	0	1	2823	2832	572833	441049
1984	May	1	45	9	6	2	5385	5391	572784	440950
1984	May	2	45	9	6	2	5299	5659	572784	440950
1984	June	1	58	11	6	2	6008	6039	572783	440949
1984	June	2	58	12	6	2	5809	5662	572783	440949
1984	July	1	66	7	0	1	2577	2533	572782	440950
1984	July	2	66	7	0	1	3594	3511	572784	440949
1984	August	1	73	11	6	2	.	.	572785	440948
1984	August	2	73	9	6	2	.	.	572784	440949
1984	September	1	63	12	12	3	7873	.	572783	440948
1984	September	2	63	16	12	3	.	.	572784	440949

TRANSECT=IX STATION=2

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	40	30	30	6	16049	17038	572780	440945
1983	April	2	40	30	30	6	14387	15011	572582	440947
1983	May	1	46	39	36	7	20807	22347	572781	440946
1983	May	2	46	39	36	7	20383	21908	572582	440847
1983	June	1	53	39	36	7	17453	17874	572686	440947
1983	June	2	53	40	36	7	17965	19369	572685	440947
1983	July	1	65	32	30	6	17397	18144	572786	440948
1983	July	2	64	34	30	6	16914	17737	572683	440947
1983	August	1	71	36	33	6	18678	19091	572880	441043
1983	August	2	71	35	33	6	17873	18357	572832	440996
1984	May	1	45	40	30	6	15593	16571	572784	440947
1984	May	2	45	42	30	6	14493	15732	572781	440946
1984	June	1	58	35	30	6	17338	16953	572784	440947
1984	June	2	58	38	30	6	17541	15968	572781	440946
1984	July	1	66	35	30	6	16059	16344	572783	440946
1984	July	2	66	36	30	6	15291	16165	572783	440946
1984	August	1	73	34	30	6	15696	16335	572783	440946
1984	August	2	73	34	30	6	15194	15789	572783	440947
1984	September	1	63	40	36	7	18242	19312	572781	440945
1984	September	2	63	41	36	7	16656	17611	572779	440945

TRANSECT=IX STATION=3

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	40	39	36	7	18404	19705	572676	440844
1983	April	2	40	39	36	7	18319	19476	572771	441041
1983	May	1	45	44	42	8	23701	25279	572579	440944
1983	May	2	45	44	42	8	27058	29396	572576	441141
1983	June	1	53	44	42	8	20603	21788	572584	440943
1983	June	2	53	44	42	8	21175	22603	572780	440944
1983	July	1	64	43	36	7	18345	19023	572729	440994
1983	July	2	64	45	36	7	19414	20226	572927	441092
1983	August	1	71	41	39	7	20447	21353	572830	440994
1983	August	2	71	43	39	7	18192	19245	572973	441140
1984	May	1	45	43	36	7	17987	18376	572778	440945
1984	May	2	45	43	36	7	18883	19816	572778	440945
1984	June	1	58	46	42	8	22680	21275	572778	440943
1984	June	2	58	44	42	8	20101	19734	572777	440942
1984	July	1	66	43	36	7	19457	20301	572780	440944
1984	July	2	66	39	36	7	17466	18477	572779	440945
1984	August	1	73	43	42	8	21401	21101	572780	440944
1984	August	2	73	43	42	8	21806	22543	572782	440944
1984	September	1	63	44	42	8	20020	21409	572776	440941
1984	September	2	63	42	42	8	17698	18872	572774	440940

TRANSECT=IX STATION=4

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	40	36	36	7	17859	18753	572769	441085
1983	April	2	40	36	36	7	19718	20787	572865	441134
1983	May	1	45	39	36	7	21521	22456	572770	441135
1983	May	2	45	39	36	7	20999	21815	572570	440938
1983	June	1	53	42	36	7	17444	18587	572675	440941
1983	June	2	53	42	36	7	17911	18981	572771	440989
1983	July	1	65	42	30	6	20301	21082	572824	441039
1983	July	2	65	42	30	6	19790	20487	572625	440940
1983	August	1	71	42	39	7	18047	18962	572971	441136
1983	August	2	71	43	39	7	19397	20495	572872	441038
1984	May	1	45	39	36	7	16623	17645	572773	440940
1984	May	2	45	39	36	7	18839	20041	572772	440940
1984	June	1	58	40	36	7	18608	17835	572770	440939
1984	June	2	58	41	36	7	17775	18508	572771	440939
1984	July	1	67	43	30	6	16412	16879	572777	440941
1984	July	2	67	40	30	6	16999	17485	572777	440940
1984	August	1	73	41	36	7	17820	19815	572774	440940
1984	August	2	73	41	36	7	18475	19677	572772	440941
1984	September	1	63	40	36	7	16992	18098	572771	440938
1984	September	2	63	40	36	7	17339	18566	572772	440938

TRANSECT=IX STATION=5

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	40	3	0	1	2935	2938	572666	440936
1983	April	2	40	3	0	1	2976	2702	572664	441033
1983	May	1	45	3	0	1	2641	2836	572666	441134
1983	May	2	45	3	0	1	1840	1980	572760	441132
1983	June	1	54	4	0	1	2639	2781	572768	440938
1983	June	2	54	4	0	1	2513	2500	572767	440936
1983	July	1	65	3	0	1	2279	2340	572869	441036
1983	July	2	65	3	0	1	2037	2050	572768	440987
1983	August	1	72	3	0	1	2846	2959	572865	441034
1983	August	2	72	3	0	1	2749	2712	572815	440986
1984	May	1	49	9	0	1	2346	2468	572764	440936
1984	May	2	49	6	0	1	2194	2412	572764	440936
1984	June	1	58	6	0	1	2924	3231	572764	440937
1984	June	2	58	5	0	1	2997	3195	572764	440936
1984	July	1	67	10	6	2	5071	5342	572770	440937
1984	July	2	67	11	6	2	4959	4918	572765	440937
1984	August	1	73	9	6	2	4725	5104	572765	440936
1984	August	2	73	9	6	2	4565	5379	572866	440936
1984	September	1	63	9	6	2	3292	3772	572769	440936
1984	September	2	63	9	6	2	4386	5028	572769	440936

TRANSECT=X STATION=1

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	41	18	18	4	11957	12898	570385	439537
1983	April	2	41	18	18	4	10486	11050	570584	439634
1983	May	1	54	20	18	4	10614	11139	570612	439650
1983	May	2	54	20	18	4	11264	11619	570612	439650
1983	June	1	59	20	18	4	12893	11758	570510	439501
1983	June	2	59	20	18	4	9451	9417	570456	439351
1983	July	1	71	21	12	3	8558	8863	570461	439452
1983	July	2	71	21	12	3	8611	8965	570555	439599
1983	August	1	71	22	20	4	10812	11205	570506	439451
1983	August	2	71	21	20	4	10587	11003	570457	439451
1984	May	1	51	22	18	4	9517	10581	570503	439450
1984	May	2	51	22	18	4	10460	10771	570502	439450
1984	June	1	66	20	12	3	8025	6963	570505	439451
1984	June	2	65	20	12	3	8970	9067	570503	439449
1984	July	1	70	21	18	4	11129	11383	570507	439451
1984	July	2	70	19	18	4	11812	11856	570506	439451
1984	August	1	76	22	18	4	11580	11531	570508	439452
1984	August	2	76	22	18	4	11239	11459	570507	439451
1984	September	1	64	18	18	4	12513	12410	570507	439452
1984	September	2	64	18	18	4	10451	11027	570506	439450

TRANSECT=X STATION=2

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	41	18	18	4	11541	12512	570689	439623
1983	April	2	41	18	18	4	12828	11031	570396	439524
1983	May	1	53	25	24	5	14780	15570	570318	439439
1983	May	2	53	25	24	5	15095	15930	570315	439434
1983	June	1	58	14	12	3	7744	8516	570451	439531
1983	June	2	58	14	12	3	8085	8717	570449	439481
1983	July	1	71	15	12	3	7792	8158	570357	439536
1983	July	2	71	16	12	3	8507	8731	570404	439483
1983	August	1	71	15	13	3	8125	8564	570647	439531
1983	August	2	71	16	13	3	8435	8681	570500	439434
1984	May	1	49	14	12	3	7670	8181	570498	439433
1984	May	2	49	14	12	3	6827	7618	570498	439433
1984	June	1	65	14	12	3	7733	8357	570550	439432
1984	June	2	65	14	12	3	8432	8819	570550	439434
1984	July	1	69	14	12	3	7645	8204	570502	439434
1984	July	2	69	14	12	3	8275	8666	570500	439433
1984	August	1	75	13	12	3	8131	8589	570499	439432
1984	August	2	75	13	12	3	8569	8839	570499	439433
1984	September	1	63	13	12	3	8314	8504	570499	439432
1984	September	2	63	12	12	3	7167	7208	570498	439432

TRANSECT=X STATION=3

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	41	24	24	5	14094	16708	570699	439616
1983	April	2	41	24	24	5	13766	14076	570698	439616
1983	May	1	50	33	30	6	17752	18764	570630	439540
1983	May	2	50	33	30	6	15242	16006	570432	439441
1983	June	1	60	34	30	6	15328	16254	570450	439469
1983	June	2	60	34	30	6	16415	17489	570595	439317
1983	July	1	70	33	30	6	16451	17215	570594	439616
1983	July	2	70	30	30	6	16592	17208	570499	439469
1983	August	1	70	29	26	5	13256	13444	570397	439419
1983	August	2	71	31	26	5	13382	13774	570493	439418
1984	May	1	49	34	30	6	14140	16149	570495	439418
1984	May	2	49	34	30	6	13531	15485	570496	439419
1984	June	1	66	35	30	6	15297	16087	570493	439417
1984	June	2	66	33	30	6	15222	15607	570496	439419
1984	July	1	69	32	30	6	14922	15602	570483	439416
1984	July	2	69	32	30	6	15677	16648	570497	439420
1984	August	1	75	30	30	6	17027	17952	570498	439420
1984	August	2	75	32	30	6	16873	17492	570495	439419
1984	September	1	65	28	24	5	12866	13236	570494	439417
1984	September	2	65	29	24	5	11673	12117	570494	439417

TRANSECT=X STATION=4

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	41	9	6	2	6893	7138	570500	439510
1983	April	2	41	9	6	2	6192	6831	570501	439413
1983	May	1	52	7	6	2	5372	5822	570397	439510
1983	May	2	52	7	6	2	4979	5533	570395	439510
1'83	June	1	60	5	0	1	3293	3500	570591	439408
1983	June	2	60	5	0	1	2807	3049	570592	439508
1983	July	1	70	5	0	1	3401	3566	570396	439460
1983	July	2	70	5	0	1	3064	3156	570499	439463
1983	August	1	70	4	0	1	2662	2708	570591	439509
1983	August	2	70	4	0	1	2779	2770	570641	439559
1984	May	1	50	10	6	2	4462	4962	570494	439410
1984	May	2	50	10	6	2	4724	5172	570495	439411
1984	June	1	67	10	0	1	2961	3003	570496	439413
1984	June	2	67	6	0	1	3137	3197	570496	439413
1984	July	1	71	11	6	2	6079	6435	570497	439412
1984	July	2	71	11	6	2	4998	5270	570496	439411
1984	August	1	76	10	6	2	5341	5590	570496	439412
1984	August	2	76	10	6	2	3943	4168	570496	439412
1984	September	1	64	10	6	2	5334	5408	570495	439411
1984	September	2	64	10	6	2	5292	5403	570496	439412

TRANSECT=XI STATION=1

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	42	24	24	5	13971	15004	570020	439372
1983	April	2	42	24	24	5	12991	13776	570216	439372
1983	May	1	54	21	18	4	12981	14433	570220	439376
1983	May	2	54	21	18	4	13171	14820	570218	439276
1983	June	1	59	20	18	4	11316	11757	570127	439280
1983	June	2	59	20	18	4	9746	10488	570080	439230
1983	July	1	72	20	18	4	11315	11329	570126	439281
1983	July	2	72	20	18	4	11246	11829	570030	439282
1983	August	1	71	20	20	4	11213	11276	570224	439378
1983	August	2	71	20	20	4	10763	10857	570127	439330
1984	May	1	51	19	18	4	9213	10400	570124	439280
1984	May	2	51	19	18	4	10237	10989	570125	439280
1984	June	1	66	20	18	4	10084	9930	570126	439281
1984	June	2	66	20	18	4	10447	10801	570127	439281
1984	July	1	70	19	18	4	11094	11485	570126	439280
1984	July	2	70	21	18	4	10763	11510	570126	439281
1984	August	1	76	20	18	4	12540	12797	570127	439281
1984	August	2	76	20	18	4	10937	10421	570127	439281
1984	September	1	64	21	18	4	11567	11103	570126	439280
1984	September	2	64	21	18	4	10096	10324	570126	439280

TRANSECT=XI STATION=2

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	42	30	30	6	14857	15654	570311	439459
1983	April	2	42	30	30	6	18744	17465	570111	439261
1983	May	1	51	33	30	6	18087	19514	570320	439462
1983	May	2	51	33	30	6	17248	18592	570222	439459
1983	June	1	57	35	30	6	11929	12330	570120	439216
1983	June	2	57	33	30	6	14087	14672	569968	439312
1983	July	1	72	34	30	6	16898	18071	570025	439268
1983	July	2	72	32	30	6	15382	13047	570073	439266
1983	August	1	71	35	33	6	15891	16450	570216	439363
1983	August	2	71	34	33	6	16529	17026	570170	439363
1984	May	1	48	34	30	6	15479	15627	570122	439265
1984	May	2	48	34	30	6	14374	15238	570120	439264
1984	June	1	65	34	30	6	15098	14006	570120	439267
1984	June	2	65	34	30	6	12738	11285	570119	439267
1984	July	1	69	35	30	6	15680	16842	570119	439266
1984	July	2	69	35	30	6	16214	17294	570120	439265
1984	August	1	74	35	30	6	15853	14135	570120	439266
1984	August	2	74	35	30	6	16588	16436	570119	439265
1984	September	1	63	34	30	6	14446	15158	570119	439264
1984	September	2	63	34	30	6	18446	19037	570122	439266

TRANSECT=XI STATION=3

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	42	24	24	5	14804	15923	570307	439448
1983	April	2	42	24	24	5	13905	14778	570009	439349
1983	May	1	51	32	30	6	17363	18829	570217	439354
1983	May	2	51	32	30	6	18174	20161	570314	439350
1983	June	1	59	35	30	6	13657	13924	570267	439353
1983	June	2	59	35	30	6	16825	17967	570074	439356
1983	July	1	72	32	30	6	16290	16868	570071	439357
1983	July	2	70	34	30	6	16038	16774	570069	439257
1983	August	1	70	34	33	6	14857	14842	570166	439354
1983	August	2	70	34	33	6	15513	15434	570215	439404
1984	May	1	49	35	30	6	15313	16404	570118	439255
1984	May	2	49	35	30	6	16823	17895	570120	439256
1984	June	1	67	34	30	6	16467	14658	570119	439257
1984	June	2	67	34	30	6	15246	16470	570120	439257
1984	July	1	71	35	30	6	16339	16949	570121	439257
1984	July	2	71	35	30	6	15818	15370	570120	439257
1984	August	1	76	34	30	6	16550	16492	570119	439256
1984	August	2	76	33	30	6	15364	15398	570119	439257
1984	September	1	64	34	30	6	16493	17533	570119	439256
1984	September	2	64	34	30	6	15820	16488	570119	439257

TRANSECT=XII STATION=1

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	42	21	18	4	13402	14450	569510	438924
1983	April	2	42	21	18	4	12764	13942	569505	438924
1983	May	1	58	29	24	5	11570	12060	569312	438929
1983	May	2	58	29	24	5	13086	13712	569509	438927
1983	June	1	64	28	24	5	13852	14789	569507	439024
1983	June	2	64	28	24	5	13310	14111	569406	438975
1983	July	1	76	28	24	5	14243	14706	569552	438976
1983	July	2	76	31	24	5	15343	15976	569503	438927
1983	August	1	76	29	26	5	13253	13773	569507	438928
1983	August	2	76	31	26	5	13332	13895	569503	438926
1984	May	1	55	28	24	5	13117	13982	569503	438924
1984	May	2	55	28	24	5	13461	14021	569500	438924
1984	June	1	70	30	24	5	12767	12040	569505	438926
1984	June	2	70	31	24	5	13391	12116	569505	438927
1984	July	1	75	30	24	5	14334	7492	569503	438925
1984	July	2	76	30	24	5	12895	9532	569504	438927
1984	August	1	81	30	30	6	15846	16258	569505	438926
1984	August	2	81	30	30	6	16951	15822	569505	438926
1984	September	1	66	32	30	6	17402	17594	569503	438926
1984	September	2	66	32	30	6	16451	17191	569502	438926

TRANSECT=XIII STATION=1

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	40	36	36	7	24067	25985	569413	439029
1983	April	2	40	36	36	7	22531	24621	569410	438835
1983	May	1	56	34	30	6	19659	18249	569407	438740
1983	May	2	56	34	30	6	17299	18969	569409	439030
1983	June	1	60	38	36	7	19549	20800	569468	438941
1983	June	2	60	38	36	7	17447	18616	569321	438941
1983	July	1	72	36	30	6	16810	17465	569365	438889
1983	July	2	72	37	30	6	17158	17870	569517	438941
1983	August	1	73	39	39	7	21118	21833	569419	438843
1983	August	2	73	40	39	7	19975	20705	569418	438843
1984	May	1	52	34	30	6	16793	.	569416	438842
1984	May	2	52	32	30	6	16809	16848	569416	438442
1984	June	1	66	39	36	7	20750	19707	569420	438844
1984	June	2	66	38	36	7	17503	16310	569419	438843
1984	July	1	71	40	36	7	20553	16968	569420	438844
1984	July	2	71	38	36	7	20403	20800	569419	438843
1984	August	1	76	39	36	7	19929	20847	569419	438843
1984	August	2	76	39	36	7	19452	19821	569418	438843
1984	September	1	64	33	30	6	16933	17134	569416	438841
1984	September	2	64	34	30	6	16482	16943	569416	438841

TRANSECT=XIII STATION=2

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	40	36	36	7	22106	24487	569510	438924
1983	April	2	40	36	36	7	22051	24403	569514	438925
1983	May	1	52	38	36	7	17703	19401	569511	438930
1983	May	2	52	38	36	7	22174	23088	569421	438834
1983	June	1	59	40	36	7	17851	20072	569370	438885
1983	June	2	59	37	36	7	14457	17209	569519	438836
1983	July	1	72	40	30	6	15677	16481	569272	438838
1983	July	2	72	40	30	6	15481	15662	569470	438883
1983	August	1	72	39	39	7	17919	18465	569424	438840
1983	August	2	72	34	33	6	18494	19338	569424	438838
1984	May	1	51	41	36	7	17948	17991	569415	438737
1984	May	2	51	41	36	7	19576	19639	569417	438739
1984	June	1	66	39	36	7	16060	15937	569419	438838
1984	June	2	66	39	36	7	16599	16760	569421	438838
1984	July	1	69	38	36	7	17814	18607	569420	438836
1984	July	2	69	37	36	7	18753	20107	569421	438837
1984	August	1	76	36	36	7	19063	18336	569423	438839
1984	August	2	76	36	36	7	17964	18794	569423	438838
1984	September	1	63	40	36	7	17875	18083	569419	438837
1984	September	2	63	40	36	7	19028	14317	569421	438839

TRANSECT=XIII STATION=3

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	40	36	36	7	25167	27408	569220	438824
1983	April	2	40	36	36	7	22946	24162	569222	438890
1983	May	1	51	36	36	7	19194	20346	569527	439030
1983	May	2	51	36	36	7	19313	20055	569625	439029
1983	June	1	59	39	36	7	17139	18655	569481	438886
1983	June	2	59	39	36	7	16180	19074	569432	438837
1983	July	1	70	35	30	6	18970	19383	569427	438837
1983	July	2	70	37	30	6	15809	16074	569427	438834
1983	August	1	72	35	33	6	16961	17425	569431	438835
1983	August	2	72	36	33	6	15168	15766	569431	438835
1984	May	1	49	38	36	7	18182	18446	569435	438835
1984	May	2	49	36	36	7	17819	17362	569287	438835
1984	June	1	67	37	30	6	15076	15563	569435	438836
1984	June	2	67	36	30	6	15079	15344	569436	438836
1984	July	1	70	39	36	7	17862	18641	569437	438838
1984	July	2	70	39	36	7	18721	20006	569438	438839
1984	August	1	75	37	36	7	18923	19878	569436	438836
1984	August	2	75	37	36	7	17813	18263	569435	438837
1984	September	1	64	36	36	7	15406	14115	569435	438837
1984	September	2	64	36	36	7	16331	17315	569436	438837

TRANSECT=XIII STATION=4

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	40	6	6	2	6471	6987	569422	438820
1983	April	2	40	6	6	2	7011	7795	569517	438913
1983	May	1	51	13	12	3	7882	8236	569532	439024
1983	May	2	51	13	12	3	7979	8332	569433	438928
1983	June	1	60	8	6	2	5315	5515	569338	438930
1983	June	2	60	8	6	2	5344	5670	569489	438932
1983	July	1	70	33	24	5	13832	14208	569440	438837
1983	July	2	70	35	24	5	14748	14948	569540	438937
1983	August	1	72	38	33	6	16325	14799	569435	438835
1983	August	2	72	34	33	6	15782	12614	569435	438835
1984	May	1	50	21	18	4	8712	8274	569437	438833
1984	May	2	50	23	18	4	10189	9902	569437	438833
1984	June	1	67	25	24	5	11641	11671	569441	438837
1984	June	2	67	27	24	5	12967	12871	569442	438838
1984	July	1	70	24	18	4	10258	11198	569441	438836
1984	July	2	70	21	18	4	11243	12130	569443	438837
1984	August	1	76	20	18	4	10337	10524	569440	438836
1984	August	2	76	23	18	4	10499	10953	569442	438838
1984	September	1	64	24	24	5	13745	15593	569442	438837
1984	September	2	64	24	24	5	12430	11622	569444	438839

TRANSECT=XIV STATION=1

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	41	4	0	1	5662	5800	569057	438380
1983	April	2	41	4	0	1	4208	4414	569058	438474
1983	May	1	51	9	6	2	6219	6882	569141	438376
1983	May	2	51	9	6	2	5935	6151	569041	438571
1983	June	1	60	8	6	2	5236	5314	569045	438477
1983	June	2	60	8	6	2	5467	5794	569046	438379
1983	July	1	72	9	6	2	5857	5784	569200	438528
1983	July	2	72	10	6	2	5826	5842	568949	438428
1983	August	1	73	7	6	2	4599	5254	569105	438432
1983	August	2	73	9	6	2	2806	2909	569107	438435
1984	May	1	49	9	6	2	5350	5191	569504	438387
1984	May	2	49	9	6	2	5605	5519	569053	438387
1984	June	1	66	10	6	2	6503	6712	569061	438387
1984	June	2	66	10	6	2	5618	5964	569062	438389
1984	July	1	70	8	6	2	5878	6276	569059	438386
1984	July	2	70	9	6	2	6047	6436	569061	438390
1984	August	1	75	12	12	3	7167	7412	569063	438390
1984	August	2	75	10	6	2	5703	5740	569062	438388
1984	September	1	64	10	6	2	2550	3416	569060	438388
1984	September	2	64	10	6	2	2721	4612	569060	438389

---------- TRANSECT=XIV STATION=2 ----------

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	41	12	12	3	9501	9899	569077	438484
1983	April	2	39	12	12	3	9780	10480	568975	438483
1983	May	1	51	11	6	2	6057	3419	569158	438481
1983	May	2	51	11	6	2	5873	6440	569159	438284
1983	June	1	60	20	18	4	9688	10512	569612	438481
1983	June	2	60	20	18	4	11515	12562	569566	438488
1983	July	1	72	23	18	4	11046	11408	569069	438437
1983	July	2	72	24	18	4	11447	11928	569073	438388
1983	August	1	73	22	20	4	10913	11134	569067	438387
1983	August	2	73	22	20	4	10506	10751	569069	438384
1984	May	1	49	24	24	5	14000	.	569068	438393
1984	May	2	49	24	24	5	13243	.	569070	438391
1984	June	1	66	22	18	4	9782	10101	569070	438388
1984	June	2	66	23	18	4	10521	10706	569075	438391
1984	July	1	70	23	18	4	10094	10218	569072	438390
1984	July	2	70	23	18	4	10802	11041	569075	438391
1984	August	1	76	23	18	4	10880	10338	569071	438389
1984	August	2	76	23	18	4	10384	10757	569073	438389
1984	September	1	64	23	18	4	12621	10411	569076	438391
1984	September	2	64	22	18	4	10204	10282	569075	438390

---------- TRANSECT=XIV STATION=3 ----------

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	39	24	24	5	15223	16271	568899	438184
1983	April	2	39	24	24	5	13766	14829	568989	438187
1983	May	1	51	34	30	6	18532	19932	569287	438590
1983	May	2	51	34	30	6	17985	19362	569094	438396
1983	June	1	60	33	30	6	14802	15809	569091	438394
1983	June	2	60	34	30	6	14200	15239	569092	438493
1983	July	1	72	35	30	6	15735	16331	569090	438488
1983	July	2	72	32	30	6	15539	16639	569094	438394
1983	August	1	73	34	33	6	16789	17023	569141	438442
1983	August	2	73	34	33	6	17746	18487	569139	438442
1984	May	1	48	34	30	6	15418	14887	569089	438394
1984	May	2	48	34	30	6	16863	16126	569089	438394
1984	June	1	67	33	30	6	14285	14848	569094	438395
1984	June	2	67	33	30	6	15804	16179	569091	438395
1984	July	1	70	35	30	6	13043	14029	569090	438391
1984	July	2	70	33	30	6	15762	16455	569093	438394
1984	August	1	76	34	30	6	15281	15741	569091	438393
1984	August	2	76	33	30	6	15299	15694	569091	438393
1984	September	1	64	34	30	6	15487	16339	569090	438392
1984	September	2	64	33	30	6	17797	14745	569090	438390

TRANSECT=XIV STATION=4

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	39	21	18	4	11070	11493	569011	438491
1983	April	2	39	21	18	4	10176	10491	569303	438586
1983	May	1	52	19	18	4	10591	11158	569022	438403
1983	May	2	52	19	18	4	12989	13648	569022	438302
1983	June	1	60	27	24	5	13569	14075	569212	438496
1983	June	2	60	24	18	4	7712	8451	569259	438544
1983	July	1	72	24	18	4	10819	11263	569116	438500
1983	July	2	72	24	18	4	11006	11772	569162	438450
1983	August	1	73	26	26	5	13662	13889	569113	438399
1983	August	2	73	22	20	4	12497	13220	569113	438401
1984	May	1	49	20	18	4	11221	10849	569110	438402
1984	May	2	49	23	18	4	9211	8904	569108	438400
1984	June	1	67	25	18	4	10106	10520	569115	438401
1984	June	2	67	24	18	4	10358	10721	569116	438403
1984	July	1	70	25	18	4	12457	12639	569113	438399
1984	July	2	70	25	18	4	11462	12024	569114	438400
1984	August	1	76	22	18	4	10213	9943	569112	438399
1984	August	2	76	22	18	4	11097	10863	569112	438399
1984	September	1	64	22	18	4	11300	10179	569112	438399
1984	September	2	64	22	18	4	11360	9967	569111	438400

TRANSECT=XIV STATION=5

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	39	9	6	2	6582	6628	569314	438495
1983	April	2	39	9	6	2	6408	4958	569311	438490
1983	May	1	54	10	6	2	6390	6271	569127	438603
1983	May	2	54	10	6	2	5521	5832	569031	438406
1983	June	1	60	10	6	2	5667	6066	569227	438552
1983	June	2	60	11	6	2	5416	5936	569227	438504
1983	July	1	72	10	6	2	5327	5663	569179	438456
1983	July	2	72	11	6	2	5231	5756	569226	438501
1983	August	1	72	7	6	2	5832	6032	569129	438406
1983	August	2	72	7	6	2	6111	6066	569129	438406
1984	May	1	49	10	6	2	5177	5145	569129	438405
1984	May	2	49	10	6	2	5348	5066	569129	438406
1984	June	1	70	10	6	2	4616	4971	569129	438404
1984	June	2	70	10	6	2	4148	4694	569130	438406
1984	July	1	71	8	6	2	4936	5137	569129	438404
1984	July	2	71	9	6	2	5430	5669	569129	438405
1984	August	1	76	10	6	2	5364	5256	569129	438404
1984	August	2	76	10	6	2	4699	4895	569128	438404
1984	September	1	65	10	6	2	5285	5464	569126	438403
1984	September	2	65	10	6	2	5478	5704	569126	438403

TRANSECT=XV STATION=1

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	41	9	6	2	6696	7369	568713	438076
1983	April	2	41	9	6	2	4228	6123	568316	438076
1983	May	1	51	12	12	3	9930	9313	568718	438256
1983	May	2	51	12	12	3	7989	8854	568816	438256
1983	June	1	62	12	12	3	8489	8867	568764	438203
1983	June	2	62	12	12	3	8578	8820	568813	438107
1983	July	1	71	11	6	2	6141	6519	568712	438055
1983	July	2	71	12	6	2	5789	6100	568761	438154
1983	August	1	73	14	13	3	9392	2779	568711	438047
1983	August	2	73	13	13	3	8437	1918	568612	438047
1984	May	1	51	12	12	3	7403	7040	568718	438061
1984	May	2	51	12	12	3	8006	7498	568716	438061
1984	June	1	66	12	6	2	5552	5893	568765	438185
1984	June	2	66	12	6	2	5465	5689	568760	438183
1984	July	1	70	12	12	3	7505	7796	568715	438059
1984	July	2	70	12	12	3	7844	8190	568716	438060
1984	August	1	75	11	6	2	5604	5968	568713	438057
1984	August	2	75	11	6	2	5369	5728	568714	438057
1984	September	1	64	11	6	2	6044	5405	.	.
1984	September	2	64	11	6	2	7283	6931	.	.

TRANSECT=XV STATION=2

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	41	9	6	2	6045	6778	568756	438081
1983	April	2	41	9	6	2	5242	5636	568759	438071
1983	May	1	51	12	12	3	7899	8561	568573	438077
1983	May	2	51	12	12	3	7708	8331	568573	438077
1983	June	1	61	11	6	2	6000	6488	568648	438094
1983	June	2	61	11	6	2	4938	5082	568745	438190
1983	July	1	71	12	6	2	5789	6124	568860	438170
1983	July	2	71	12	6	2	5886	6198	568761	438072
1983	August	1	72	13	13	3	7431	7487	568751	438056
1983	August	2	72	13	13	3	8638	6229	568756	438058
1984	May	1	50	11	6	2	5937	5904	568808	438096
1984	May	2	50	11	6	2	5210	4906	568804	438096
1984	June	1	66	12	6	2	5280	5620	568795	438191
1984	June	2	66	12	6	2	5623	5952	568792	438189
1984	July	1	70	12	12	3	7955	8225	568756	438072
1984	July	2	70	12	12	3	7619	8017	568758	438072
1984	August	1	75	12	12	3	7925	8437	568748	438065
1984	August	2	75	12	12	3	7445	7746	568749	438065
1984	September	1	63	12	12	3	9734	8921	.	.
1984	September	2	63	12	12	3	10307	9735	.	.

TRANSECT=XV STATION=3

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	41	6	0	1	2581	2723	568816	438091
1983	April	2	41	6	0	1	3134	3493	568623	438091
1983	May	1	51	10	6	2	5676	6509	568826	438096
1983	May	2	51	10	6	2	6692	7555	568730	438097
1983	June	1	61	9	6	2	6489	6778	568681	438049
1983	June	2	61	10	6	2	5123	5380	568926	438195
1983	July	1	71	11	6	2	5133	5312	568757	438088
1983	July	2	71	11	6	2	5801	3951	568759	438088
1983	August	1	72	10	6	2	6394	6615	568809	438081
1983	August	2	72	10	6	2	6090	6093	568808	438081
1984	May	1	51	9	6	2	5554	5530	568840	438100
1984	May	2	51	9	6	2	5482	5185	568836	438101
1984	June	1	67	9	6	2	5303	5545	568828	438202
1984	June	2	67	10	6	2	4955	5191	568825	438197
1984	July	1	71	12	12	3	8092	8398	568792	438082
1984	July	2	71	12	12	3	8387	9100	568796	438088
1984	August	1	75	10	6	2	5718	230	568786	438075
1984	August	2	75	11	6	2	5649	5852	568787	438075
1984	September	1	64	11	6	2	5906	6173	.	.
1984	September	2	64	11	6	2	5942	6167	.	.

TRANSECT=XV STATION=4

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	41	12	12	3	8331	8758	568877	438102
1983	April	2	41	12	12	3	8687	8975	568879	438106
1983	May	1	51	14	6	2	6348	7304	568874	438112
1983	May	2	51	14	6	2	4913	5357	568679	438108
1983	June	1	60	14	12	3	.	8543	568983	438211
1983	June	2	60	15	12	3	.	8126	568929	438211
1983	July	1	71	14	12	3	8482	5599	568830	438160
1983	July	2	71	14	12	3	8889	9461	568682	438112
1983	August	1	72	14	13	3	8169	8248	568874	438107
1983	August	2	72	14	13	3	8514	8777	568875	438107
1984	May	1	49	14	12	3	8272	7907	568879	438113
1984	May	2	49	15	12	3	8150	7640	568876	438112
1984	June	1	67	14	12	3	7931	6925	568887	438215
1984	June	2	67	14	12	3	8321	8476	568881	438213
1984	July	1	71	14	12	3	8284	8525	568480	438412
1984	July	2	71	14	12	3	7314	7458	568882	438115
1984	August	1	75	14	12	3	8606	8938	568878	438109
1984	August	2	75	14	12	3	7946	8350	568878	438109
1984	September	1	64	14	12	3	8160	8642	568880	438112
1984	September	2	64	14	12	3	8519	6502	568874	438107

TRANSECT=XV STATION=5

YEAR	MONTH	TOW	TEMP	DEPTH	FSHDEPTH	MIN	TOW METER IN	TOW METER OUT	LORAN UPPER	LORAN LOWER
1983	April	1	41	4	0	1	3541	3846	569026	438120
1983	April	2	41	4	0	1	3143	4234	569024	438119
1983	May	1	52	7	0	1	2950	3442	569029	438224
1983	May	2	52	7	0	1	2487	2769	568834	438125
1983	June	1	61	5	0	1	2926	3173	568980	438224
1983	June	2	61	5	0	1	3041	3051	568931	437927
1983	July	1	71	5	0	1	3050	3122	568883	438125
1983	July	2	71	6	0	1	2870	3003	568485	438128
1983	August	1	72	5	0	1	2058	2120	568932	438126
1983	August	2	72	5	0	1	2497	2604	568932	438126
1984	May	1	51	10	6	2	5469	5217	568933	438126
1984	May	2	51	10	6	2	5295	4965	568933	438127
1984	June	1	68	10	6	2	2835	2995	568931	438226
1984	June	2	68	6	6	2	3018	3229	568931	438226
1984	July	1	71	10	6	2	4922	5447	568934	438128
1984	July	2	71	10	6	2	4932	5249	568933	438128
1984	August	1	76	9	6	2	4868	5192	568933	438127
1984	August	2	76	9	6	2	5599	5794	568933	438123
1984	September	1	64	10	6	2	5019	4525	568933	438127
1984	September	2	64	10	6	2	5574	4314	568933	438128

APPENDIX 5. Collections of fish eggs by station, date, and species.

EGG SIZE = egg diameter in mm.

RIVER=ST. CLAIR

STATION	MONTH	SPECIES	EGG SIZE	NUMBER	YEAR
77	June	ALEWIFE	1.0	12	1983
79	June	ALEWIFE	1.0	33	1983
81	June	ALEWIFE	1.0	70	1983
71	June	ALEWIFE	1.1	16	1983
74	June	ALEWIFE	1.1	324	1983
75	June	ALEWIFE	1.1	1	1983
33	May	GIZZARD SHAD	0.9	1	1983
69	June	GIZZARD SHAD	0.9	25	1983
42	June	GIZZARD SHAD	1.0	4	1983
51	June	GIZZARD SHAD	1.0	219	1983
11	April	RAINBOW SMELT	0.8	1	1983
3	May	RAINBOW SMELT	0.9	26	1983
12	April	RAINBOW SMELT	0.9	16	1983
13	April	RAINBOW SMELT	0.9	112	1983
15	April	RAINBOW SMELT	0.9	17	1983
17	April	RAINBOW SMELT	0.9	5	1983
29	April	RAINBOW SMELT	0.9	80	1983
2	May	RAINBOW SMELT	1.0	31	1983
8	May	RAINBOW SMELT	1.0	458	1983
10	April	RAINBOW SMELT	1.0	16	1983
13	April	RAINBOW SMELT	1.0	314	1983
20	April	RAINBOW SMELT	1.0	58	1983
24	April	RAINBOW SMELT	1.0	416	1983
27	April	RAINBOW SMELT	1.0	158	1983
31	April	RAINBOW SMELT	1.0	113	1983
32	April	RAINBOW SMELT	1.0	34	1983
46	April	RAINBOW SMELT	1.0	1	1983
47	April	RAINBOW SMELT	1.0	10	1983
48	April	RAINBOW SMELT	1.0	6	1983
49	April	RAINBOW SMELT	1.0	8	1983
52	April	RAINBOW SMELT	1.0	9	1983
53	June	RAINBOW SMELT	1.0	87	1983
54	April	RAINBOW SMELT	1.0	13	1983
54	June	RAINBOW SMELT	1.0	21	1983
54	June	RAINBOW SMELT	1.0	202	1983
55	April	RAINBOW SMELT	1.0	4	1983
56	June	RAINBOW SMELT	1.0	5	1983
58	April	RAINBOW SMELT	1.0	380	1983
59	April	RAINBOW SMELT	1.0	26	1983
60	April	RAINBOW SMELT	1.0	325	1983
61	April	RAINBOW SMELT	1.0	253	1983
62	April	RAINBOW SMELT	1.0	75	1983
67	June	RAINBOW SMELT	1.0	23	1983
68	June	RAINBOW SMELT	1.0	3	1983
1	May	RAINBOW SMELT	1.1	602	1983
4	May	RAINBOW SMELT	1.1	1	1983
5	May	RAINBOW SMELT	1.1	154	1983
9	April	RAINBOW SMELT	1.1	35	1983
16	April	RAINBOW SMELT	1.1	88	1983
23	April	RAINBOW SMELT	1.1	2	1983
26	April	RAINBOW SMELT	1.1	20	1983
45	April	RAINBOW SMELT	1.1	5	1983
51	April	RAINBOW SMELT	1.1	504	1983

RIVER=ST. CLAIR

STATION	MONTH	SPECIES	EGG SIZE	NUMBER	YEAR
57	April	RAINBOW SMELT	1.1	71	1983
57	June	RAINBOW SMELT	1.1	19	1983
6	May	RAINBOW SMELT	1.2	25	1983
7	May	RAINBOW SMELT	1.2	209	1983
14	April	RAINBOW SMELT	1.2	53	1983
21	April	RAINBOW SMELT	1.2	9	1983
25	April	RAINBOW SMELT	1.2	31	1983
28	April	RAINBOW SMELT	1.2	95	1983
30	April	RAINBOW SMELT	1.2	173	1983
35	May	RAINBOW SMELT	1.2	1	1983
53	June	RAINBOW SMELT	1.2	12	1983
18	April	RAINBOW SMELT	1.3	119	1983
22	April	RAINBOW SMELT	1.3	24	1983
56	June	TROUT PERCH	1.4	7	1983
73	June	TROUT PERCH	1.4	1	1983
70	June	TROUT PERCH	1.5	1	1983
72	June	TROUT PERCH	1.5	159	1983
76	June	LOG PERCH	1.5	7	1983
67	June	YELLOW PERCH	2.3	3	1983
79	June	YELLOW PERCH	2.3	3	1983
74	June	YELLOW PERCH	2.7	7	1983
70	June	YELLOW PERCH	2.8	1	1983
72	June	YELLOW PERCH	3.3	11	1983
33	May	MOTTLED SCULPIN	1.3	3	1983
57	June	UNKNOWN	0.8	3	1983
82	June	UNKNOWN	0.8	8	1983
34	May	UNKNOWN	1.2	18	1983
7	June	ALEWIFE	0.9	2	1984
2	June	GIZZARD SHAD	0.9	2	1984
7	June	GIZZARD SHAD	0.9	2	1984
4	June	GIZZARD SHAD	1.0	2	1984
33	June	GIZZARD SHAD	1.0	4	1984
38	June	GIZZARD SHAD	1.0	3	1984
15	May	RAINBOW SMELT	0.8	47	1984
23	May	RAINBOW SMELT	0.9	20	1984
32	May	RAINBOW SMELT	0.9	7	1984
45	May	RAINBOW SMELT	0.9	12	1984
48	May	RAINBOW SMELT	0.9	10	1984
50	May	RAINBOW SMELT	0.9	3	1984
52	May	RAINBOW SMELT	0.9	2	1984
59	May	RAINBOW SMELT	0.9	15	1984
9	May	RAINBOW SMELT	1.0	151	1984
10	May	RAINBOW SMELT	1.0	226	1984
11	May	RAINBOW SMELT	1.0	77	1984
12	May	RAINBOW SMELT	1.0	41	1984
13	May	RAINBOW SMELT	1.0	102	1984
14	May	RAINBOW SMELT	1.0	228	1984
16	May	RAINBOW SMELT	1.0	38	1984
18	May	RAINBOW SMELT	1.0	102	1984
19	May	RAINBOW SMELT	1.0	48	1984
20	May	RAINBOW SMELT	1.0	36	1984
21	May	RAINBOW SMELT	1.0	21	1984

RIVER=ST. CLAIR

STATION	MONTH	SPECIES	EGG SIZE	NUMBER	YEAR
22	May	RAINBOW SMELT	1.0	153	1984
24	May	RAINBOW SMELT	1.0	32	1984
25	May	RAINBOW SMELT	1.0	12	1984
27	May	RAINBOW SMELT	1.0	16	1984
28	May	RAINBOW SMELT	1.0	19	1984
29	May	RAINBOW SMELT	1.0	33	1984
31	May	RAINBOW SMELT	1.0	21	1984
34	June	RAINBOW SMELT	1.0	27	1984
54	May	RAINBOW SMELT	1.0	5	1984
57	May	RAINBOW SMELT	1.0	120	1984
60	May	RAINBOW SMELT	1.0	13	1984
62	May	RAINBOW SMELT	1.0	14	1984
17	May	RAINBOW SMELT	1.1	37	1984
26	May	RAINBOW SMELT	1.1	3	1984
30	May	RAINBOW SMELT	1.1	74	1984
51	May	RAINBOW SMELT	1.1	16	1984
58	May	RAINBOW SMELT	1.2	18	1984
32	May	TROUT PERCH	1.0	4	1984
47	May	TROUT PERCH	1.2	4	1984
35	June	TROUT PERCH	1.3	6	1984
39	June	TROUT PERCH	1.3	2	1984
2	June	TROUT PERCH	1.4	2	1984
47	May	TROUT PERCH	2.0	1	1984
8	June	WHITE PERCH	0.8	6	1984
70	July	CARP	1.7	2	1984
58	May	WHITE SUCKER	3.2	2	1984
35	June	WHITE SUCKER	3.3	1	1984
1	June	JOHNNY DARTER	1.2	120	1984
3	June	JOHNNY DARTER	1.4	7	1984
58	May	YELLOW PERCH	1.9	3	1984
9	May	YELLOW PERCH	2.0	2	1984
10	May	YELLOW PERCH	2.0	2	1984
27	May	YELLOW PERCH	2.0	2	1984
28	May	YELLOW PERCH	2.0	1	1984
29	May	YELLOW PERCH	2.0	2	1984
60	May	YELLOW PERCH	2.0	2	1984
40	June	YELLOW PERCH	2.1	3	1984
7	June	YELLOW PERCH	2.2	2	1984
33	June	WALLEYE	2.2	1	1984
36	June	UNKNOWN	0.9	12	1984
37	June	UNKNOWN	2.0	5	1984
5	June	UNKNOWN	2.3	5	1984

RIVER=DETROIT

STATION	MONTH	SPECIES	EGG SIZE	NUMBER	YEAR
139	May	ALEWIFE	0.9	1	1983
100	June	ALEWIFE	1.0	314	1983
84	June	ALEWIFE	1.1	4	1983
107	June	ALEWIFE	1.1	42	1983
89	June	ALEWIFE	1.2	96	1983
92	June	ALEWIFE	1.2	10	1983
87	June	GIZZARD SHAD	0.9	4	1983
101	June	GIZZARD SHAD	0.9	1219	1983
102	June	GIZZARD SHAD	0.9	302	1983
103	June	GIZZARD SHAD	0.9	136	1983
108	June	GIZZARD SHAD	0.9	397	1983
109	June	GIZZARD SHAD	0.9	157	1983
110	June	GIZZARD SHAD	0.9	274	1983
113	May	GIZZARD SHAD	0.9	8	1983
156	June	GIZZARD SHAD	0.9	44	1983
158	June	GIZZARD SHAD	0.9	20	1983
159	June	GIZZARD SHAD	0.9	5	1983
97	June	GIZZARD SHAD	1.0	9	1983
107	May	RAINBOW SMELT	0.9	3	1983
144	April	RAINBOW SMELT	0.9	6	1983
104	May	RAINBOW SMELT	1.0	3	1983
128	April	RAINBOW SMELT	1.0	1	1983
137	April	RAINBOW SMELT	1.0	249	1983
148	April	RAINBOW SMELT	1.0	10	1983
150	May	RAINBOW SMELT	1.0	696	1983
153	April	RAINBOW SMELT	1.0	1	1983
153	May	RAINBOW SMELT	1.0	8	1983
102	May	RAINBOW SMELT	1.1	3	1983
127	April	RAINBOW SMELT	1.1	3	1983
135	April	RAINBOW SMELT	1.1	3	1983
138	May	RAINBOW SMELT	1.1	3	1983
142	April	RAINBOW SMELT	1.1	12	1983
146	April	RAINBOW SMELT	1.1	62	1983
147	April	RAINBOW SMELT	1.1	22	1983
149	April	RAINBOW SMELT	1.1	235	1983
152	April	RAINBOW SMELT	1.1	61	1983
156	May	RAINBOW SMELT	1.1	4	1983
159	May	RAINBOW SMELT	1.1	7	1983
124	April	RAINBOW SMELT	1.2	1	1983
98	June	CENTRAL MUDMINNOW	1.3	483	1983
125	April	NORTHERN PIKE	3.0	6	1983
130	April	NORTHERN PIKE	3.2	1	1983
157	April	BURBOT	1.3	6	1983
110	May	TROUT PERCH	1.2	1	1983
91	June	TROUT PERCH	1.3	11	1983
90	June	TROUT PERCH	1.5	10	1983
157	May	TROUT PERCH	1.8	2	1983
104	June	WHITE PERCH	0.7	182	1983
86	June	WHITE BASS	0.8	26	1983
99	June	WHITE BASS	0.8	428	1983
106	June	WHITE BASS	0.8	46	1983
112	June	WHITE BASS	0.8	194	1983
138	June	WHITE BASS	0.8	18	1983

RIVER=DETROIT

STATION	MONTH	SPECIES	EGG SIZE	NUMBER	YEAR
139	June	WHITE BASS	0.8	28	1983
154	June	WHITE BASS	0.8	175	1983
85	June	WHITE BASS	0.9	4	1983
90	June	WHITE BASS	0.9	85	1983
111	June	WHITE BASS	0.9	267	1983
113	June	WHITE BASS	0.9	68	1983
141	June	WHITE BASS	0.9	277	1983
143	June	WHITE BASS	0.9	400	1983
105	May	LOG PERCH	1.1	1	1983
158	May	LOG PERCH	1.1	41	1983
154	May	LOG PERCH	1.2	17	1983
108	June	YELLOW PERCH	2.0	21	1983
135	April	YELLOW PERCH	2.0	2	1983
137	April	YELLOW PERCH	2.0	12	1983
140	April	YELLOW PERCH	2.0	61	1983
147	April	YELLOW PERCH	2.0	5	1983
159	May	YELLOW PERCH	2.0	8	1983
98	June	YELLOW PERCH	2.1	4	1983
105	May	YELLOW PERCH	2.1	1	1983
142	April	YELLOW PERCH	2.1	2	1983
99	May	YELLOW PERCH	2.2	7	1983
159	June	YELLOW PERCH	2.2	1	1983
104	May	YELLOW PERCH	2.3	7	1983
103	May	YELLOW PERCH	2.5	29	1983
100	May	YELLOW PERCH	2.6	17	1983
131	May	YELLOW PERCH	3.0	1	1983
94	June	YELLOW PERCH	3.4	4	1983
89	June	YELLOW PERCH	3.5	5	1983
135	May	WALLEYE	1.4	4	1983
105	June	WALLEYE	1.5	255	1983
106	May	WALLEYE	1.5	2	1983
101	May	WALLEYE	1.6	5	1983
102	May	WALLEYE	2.1	3	1983
113	May	WALLEYE	2.1	1	1983
150	May	WALLEYE	2.1	1	1983
107	May	MOTTLED SCULPIN	1.3	3	1983
108	May	MOTTLED SCULPIN	1.3	6	1983
151	April	UNKNOWN	0.6	4	1983
150	April	UNKNOWN	0.7	9	1983
118	April	UNKNOWN	0.8	6	1983
143	May	UNKNOWN	2.3	1	1983
122	June	ALEWIFE	0.8	12	1984
99	July	ALEWIFE	1.2	1	1984
99	June	GIZZARD SHAD	0.8	298	1984
103	June	GIZZARD SHAD	0.8	130	1984
105	June	GIZZARD SHAD	0.8	27	1984
107	June	GIZZARD SHAD	0.8	7	1984
110	June	GIZZARD SHAD	0.8	32	1984
111	June	GIZZARD SHAD	0.8	64	1984
112	June	GIZZARD SHAD	0.8	105	1984
135	June	GIZZARD SHAD	0.8	2219	1984
141	June	GIZZARD SHAD	0.8	690	1984

RIVER=DETROIT

STATION	MONTH	SPECIES	EGG SIZE	NUMBER	YEAR
150	June	GIZZARD SHAD	0.8	5006	1984
153	June	GIZZARD SHAD	0.8	1055	1984
154	June	GIZZARD SHAD	0.8	1119	1984
155	June	GIZZARD SHAD	0.8	260	1984
156	June	GIZZARD SHAD	0.8	184	1984
157	June	GIZZARD SHAD	0.8	7	1984
159	June	GIZZARD SHAD	0.8	8	1984
106	June	GIZZARD SHAD	0.9	20	1984
108	June	GIZZARD SHAD	0.9	54	1984
131	June	GIZZARD SHAD	0.9	48	1984
132	June	GIZZARD SHAD	0.9	195	1984
138	June	GIZZARD SHAD	0.9	8	1984
158	June	GIZZARD SHAD	0.9	72	1984
100	June	GIZZARD SHAD	1.1	5	1984
126	May	RAINBOW SMELT	0.8	14	1984
149	May	RAINBOW SMELT	0.8	4	1984
135	May	RAINBOW SMELT	1.1	1	1984
147	May	RAINBOW SMELT	1.1	2	1984
101	June	WHITE PERCH	0.8	545	1984
113	June	WHITE PERCH	0.8	100	1984
143	June	WHITE BASS	0.7	1108	1984
100	June	WHITE BASS	0.8	146	1984
102	June	WHITE BASS	0.8	89	1984
139	June	WHITE BASS	0.8	38	1984
109	June	FRESHWATER DRUM	1.4	15	1984
158	June	CARP	1.6	8	1984
120	May	WHITE SUCKER	2.1	1	1984
137	May	WHITE SUCKER	2.1	5	1984
120	May	WHITE SUCKER	3.1	1	1984
124	May	WHITE SUCKER	3.1	2	1984
117	May	WHITE SUCKER	3.2	2	1984
123	May	WHITE SUCKER	3.2	7	1984
90	July	SPOTTAIL SHINER	1.0	4	1984
100	July	SPOTTAIL SHINER	1.0	3	1984
105	July	SPOTTAIL SHINER	1.0	4	1984
143	July	SPOTTAIL SHINER	1.0	1	1984
87	July	SPOTTAIL SHINER	1.1	1	1984
104	July	SPOTTAIL SHINER	1.1	1	1984
108	July	SPOTTAIL SHINER	1.1	1	1984
111	June	SPOTTAIL SHINER	1.2	4	1984
131	June	SPOTTAIL SHINER	1.3	5	1984
133	June	SPOTTAIL SHINER	1.3	2	1984
157	June	SPOTTAIL SHINER	1.3	3	1984
107	July	WHITE CRAPPIE	0.8	1	1984
144	May	YELLOW PERCH	2.1	1	1984
146	May	YELLOW PERCH	2.1	21	1984
151	May	YELLOW PERCH	2.2	37	1984
99	June	YELLOW PERCH	2.3	1	1984
133	May	YELLOW PERCH	2.7	34	1984
145	May	YELLOW PERCH	2.7	1	1984
148	May	WALLEYE	1.5	131	1984
152	May	WALLEYE	1.5	2	1984

RIVER=DETROIT

STATION	MONTH	SPECIES	EGG SIZE	NUMBER	YEAR
142	May	WALLEYE	1.8	6	1984
152	May	WALLEYE	2.2	1	1984
92	July	UNKNOWN	1.1	4	1984
134	June	UNKNOWN	1.3	83	1984
104	June	UNKNOWN	1.5	57	1984
147	May	UNKNOWN	2.0	1	1984

APPENDIX 6. Townet catches of fish by date, species, and location. Fishing effort (volume of water filtered) varied among tows; these catch data are not adjusted to equal units of effort. Catches of yolk-sac (YS) and non-yolk-sac larvae (NYS) are listed separately.

RIVER=ST. CLAIR

YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1983	JUNE	ALEWIFE	III	1	2	0	1
1983	JUNE	ALEWIFE	IV	1	2	0	2
1983	JUNE	ALEWIFE	V	1	2	0	1
1983	JUNE	ALEWIFE	IX	5	2	1	0
1983	JULY	ALEWIFE	I	1	1	4	0
1983	JULY	ALEWIFE	I	1	2	2	0
1983	JULY	ALEWIFE	I	2	1	3	0
1983	JULY	ALEWIFE	I	2	2	4	0
1983	JULY	ALEWIFE	I	3	2	0	1
1983	JULY	ALEWIFE	II	1	1	5	6
1983	JULY	ALEWIFE	II	1	2	11	6
1983	JULY	ALEWIFE	III	1	1	7	1
1983	JULY	ALEWIFE	III	1	2	15	0
1983	JULY	ALEWIFE	III	2	1	8	0
1983	JULY	ALEWIFE	III	2	2	8	1
1983	JULY	ALEWIFE	III	3	1	3	2
1983	JULY	ALEWIFE	III	3	2	5	1
1983	JULY	ALEWIFE	IV	1	1	1	0
1983	JULY	ALEWIFE	IV	1	2	0	1
1983	JULY	ALEWIFE	V	1	1	5	2
1983	JULY	ALEWIFE	VI	1	2	1	0
1983	JULY	ALEWIFE	VI	2	1	23	2
1983	JULY	ALEWIFE	VI	2	2	9	4
1983	JULY	ALEWIFE	VI	3	1	11	0
1983	JULY	ALEWIFE	VI	3	2	13	0
1983	JULY	ALEWIFE	VI	4	1	7	1
1983	JULY	ALEWIFE	VI	4	2	4	0
1983	JULY	ALEWIFE	VI	5	1	5	2
1983	JULY	ALEWIFE	VI	5	2	3	0
1983	JULY	ALEWIFE	VII	1	1	2	0
1983	JULY	ALEWIFE	VII	1	2	0	1
1983	JULY	ALEWIFE	VII	2	1	9	1
1983	JULY	ALEWIFE	VII	2	2	9	1
1983	JULY	ALEWIFE	VII	3	1	24	0
1983	JULY	ALEWIFE	VII	3	2	33	2
1983	JULY	ALEWIFE	VII	4	1	11	3
1983	JULY	ALEWIFE	VII	4	2	15	0
1983	JULY	ALEWIFE	VII	5	1	1	0
1983	JULY	ALEWIFE	VII	5	2	1	0
1983	JULY	ALEWIFE	VIII	1	1	9	2
1983	JULY	ALEWIFE	VIII	1	2	13	1
1983	JULY	ALEWIFE	VIII	2	1	9	3
1983	JULY	ALEWIFE	VIII	2	2	8	0
1983	JULY	ALEWIFE	VIII	3	1	3	0
1983	JULY	ALEWIFE	VIII	3	2	2	0
1983	JULY	ALEWIFE	VIII	3	2	3	0
1983	JULY	ALEWIFE	VIII	4	1	10	2
1983	JULY	ALEWIFE	VIII	4	2	10	2
1983	JULY	ALEWIFE	VIII	5	1	8	0
1983	JULY	ALEWIFE	VIII	5	2	16	0
1983	JULY	ALEWIFE	IX	1	1	10	0
1983	JULY	ALEWIFE	IX	1	2	9	0
1983	JULY	ALEWIFE	IX	2	1	30	4

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YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1984	JULY	UNKNOWN	IX	4	1	0	1
1983	JUNE	ALEWIFE	III	1	2	0	1
1983	JUNE	ALEWIFE	IV	1	2	0	2
1983	JUNE	ALEWIFE	V	1	2	0	1
1983	JUNE	ALEWIFE	IX	5	2	1	0
1983	JULY	ALEWIFE	I	1	1	4	0
1983	JULY	ALEWIFE	I	1	2	2	0
1983	JULY	ALEWIFE	I	2	1	3	0
1983	JULY	ALEWIFE	I	2	2	4	0
1983	JULY	ALEWIFE	I	3	2	0	1
1983	JULY	ALEWIFE	II	1	1	5	6
1983	JULY	ALEWIFE	II	1	2	11	6
1983	JULY	ALEWIFE	III	1	1	7	1
1983	JULY	ALEWIFE	III	1	2	15	0
1983	JULY	ALEWIFE	III	2	1	8	0
1983	JULY	ALEWIFE	III	2	2	8	1
1983	JULY	ALEWIFE	III	3	1	3	2
1983	JULY	ALEWIFE	III	3	2	5	1
1983	JULY	ALEWIFE	IV	1	1	1	0
1983	JULY	ALEWIFE	IV	1	2	0	1
1983	JULY	ALEWIFE	V	1	1	5	2
1983	JULY	ALEWIFE	VI	1	2	1	0
1983	JULY	ALEWIFE	VI	2	1	23	2
1983	JULY	ALEWIFE	VI	2	2	9	4
1983	JULY	ALEWIFE	VI	3	1	11	0
1983	JULY	ALEWIFE	VI	3	2	13	0
1983	JULY	ALEWIFE	VI	4	1	7	1
1983	JULY	ALEWIFE	VI	4	2	4	0
1983	JULY	ALEWIFE	VI	5	1	5	2
1983	JULY	ALEWIFE	VI	5	2	3	0
1983	JULY	ALEWIFE	VII	1	1	2	0
1983	JULY	ALEWIFE	VII	1	2	0	1
1983	JULY	ALEWIFE	VII	2	1	9	1
1983	JULY	ALEWIFE	VII	2	2	9	1
1983	JULY	ALEWIFE	VII	3	1	24	0
1983	JULY	ALEWIFE	VII	3	2	33	2
1983	JULY	ALEWIFE	VII	4	1	11	3
1983	JULY	ALEWIFE	VII	4	2	15	0
1983	JULY	ALEWIFE	VII	5	1	1	0
1983	JULY	ALEWIFE	VII	5	2	1	0
1983	JULY	ALEWIFE	VIII	1	1	9	2
1983	JULY	ALEWIFE	VIII	1	2	13	1
1983	JULY	ALEWIFE	VIII	2	1	9	3
1983	JULY	ALEWIFE	VIII	2	2	8	0
1983	JULY	ALEWIFE	VIII	3	1	3	0
1983	JULY	ALEWIFE	VIII	3	2	2	0
1983	JULY	ALEWIFE	VIII	3	2	3	0
1983	JULY	ALEWIFE	VIII	4	1	10	2
1983	JULY	ALEWIFE	VIII	4	2	10	2
1983	JULY	ALEWIFE	VIII	5	1	8	0
1983	JULY	ALEWIFE	VIII	5	2	16	0
1983	JULY	ALEWIFE	IX	1	1	10	0
1983	JULY	ALEWIFE	IX	1	2	9	0
1983	JULY	ALEWIFE	IX	2	1	30	4

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YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1983	JULY	ALEWIFE	IX	2	2	31	1
1983	JULY	ALEWIFE	IX	3	1	24	0
1983	JULY	ALEWIFE	IX	3	2	9	1
1983	JULY	ALEWIFE	IX	4	1	14	1
1983	JULY	ALEWIFE	IX	4	2	8	0
1983	JULY	ALEWIFE	IX	4	2	6	0
1983	JULY	ALEWIFE	IX	5	1	1	0
1983	JULY	ALEWIFE	IX	5	2	2	0
1983	AUGUST	ALEWIFE	I	1	1	1	19
1983	AUGUST	ALEWIFE	I	1	2	0	13
1983	AUGUST	ALEWIFE	I	2	1	5	9
1983	AUGUST	ALEWIFE	I	2	2	1	5
1983	AUGUST	ALEWIFE	I	3	1	4	5
1983	AUGUST	ALEWIFE	I	3	2	7	8
1983	AUGUST	ALEWIFE	II	1	1	0	2
1983	AUGUST	ALEWIFE	II	1	2	0	4
1983	AUGUST	ALEWIFE	III	1	1	1	5
1983	AUGUST	ALEWIFE	III	1	2	1	8
1983	AUGUST	ALEWIFE	III	2	1	1	16
1983	AUGUST	ALEWIFE	III	2	2	0	12
1983	AUGUST	ALEWIFE	III	3	1	3	8
1983	AUGUST	ALEWIFE	III	3	2	5	10
1983	AUGUST	ALEWIFE	IV	1	1	0	1
1983	AUGUST	ALEWIFE	V	1	1	0	2
1983	AUGUST	ALEWIFE	V	1	2	0	2
1983	AUGUST	ALEWIFE	VI	2	1	1	12
1983	AUGUST	ALEWIFE	VI	2	2	0	9
1983	AUGUST	ALEWIFE	VI	3	1	0	8
1983	AUGUST	ALEWIFE	VI	3	2	0	17
1983	AUGUST	ALEWIFE	VI	4	1	4	15
1983	AUGUST	ALEWIFE	VI	4	2	0	15
1983	AUGUST	ALEWIFE	VI	5	1	0	2
1983	AUGUST	ALEWIFE	VI	5	2	0	1
1983	AUGUST	ALEWIFE	VII	1	2	0	6
1983	AUGUST	ALEWIFE	VII	2	1	0	16
1983	AUGUST	ALEWIFE	VII	2	2	0	8
1983	AUGUST	ALEWIFE	VII	3	1	0	1
1983	AUGUST	ALEWIFE	VII	3	2	0	9
1983	AUGUST	ALEWIFE	VII	4	1	0	10
1983	AUGUST	ALEWIFE	VII	4	2	1	9
1983	AUGUST	ALEWIFE	VII	5	2	0	4
1983	AUGUST	ALEWIFE	VIII	1	1	0	44
1983	AUGUST	ALEWIFE	VIII	1	2	0	61
1983	AUGUST	ALEWIFE	VIII	2	1	0	58
1983	AUGUST	ALEWIFE	VIII	2	2	0	45
1983	AUGUST	ALEWIFE	VIII	3	1	0	53
1983	AUGUST	ALEWIFE	VIII	3	2	0	38
1983	AUGUST	ALEWIFE	VIII	4	1	0	2
1983	AUGUST	ALEWIFE	VIII	4	2	0	4
1983	AUGUST	ALEWIFE	VIII	5	1	0	1
1983	AUGUST	ALEWIFE	IX	2	1	0	1
1983	AUGUST	ALEWIFE	IX	2	2	0	2
1983	AUGUST	ALEWIFE	IX	3	1	1	10

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YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1983	AUGUST	ALEWIFE	IX	3	2	0	5
1983	AUGUST	ALEWIFE	IX	4	1	0	31
1983	AUGUST	ALEWIFE	IX	4	2	0	38
1983	AUGUST	ALEWIFE	IX	5	1	0	1
1984	JUNE	ALEWIFE	II	1	1	1	0
1984	JUNE	ALEWIFE	II	1	2	0	1
1984	JUNE	ALEWIFE	VII	4	2	0	2
1984	JULY	ALEWIFE	I	1	1	27	23
1984	JULY	ALEWIFE	I	1	2	15	26
1984	JULY	ALEWIFE	I	1	2	13	5
1984	JULY	ALEWIFE	I	2	1	1	9
1984	JULY	ALEWIFE	I	2	1	49	26
1984	JULY	ALEWIFE	I	2	1	15	5
1984	JULY	ALEWIFE	I	2	2	16	14
1984	JULY	ALEWIFE	I	3	1	15	20
1984	JULY	ALEWIFE	I	3	1	1	4
1984	JULY	ALEWIFE	I	3	2	18	19
1984	JULY	ALEWIFE	II	1	1	0	24
1984	JULY	ALEWIFE	II	1	2	0	13
1984	JULY	ALEWIFE	III	1	1	20	5
1984	JULY	ALEWIFE	III	1	2	17	13
1984	JULY	ALEWIFE	III	2	1	27	21
1984	JULY	ALEWIFE	III	2	1	9	4
1984	JULY	ALEWIFE	III	2	2	37	17
1984	JULY	ALEWIFE	III	2	2	5	5
1984	JULY	ALEWIFE	III	3	1	35	10
1984	JULY	ALEWIFE	III	3	1	40	30
1984	JULY	ALEWIFE	III	3	2	33	29
1984	JULY	ALEWIFE	III	3	2	26	7
1984	JULY	ALEWIFE	IV	1	1	5	4
1984	JULY	ALEWIFE	IV	1	1	2	2
1984	JULY	ALEWIFE	IV	1	2	4	14
1984	JULY	ALEWIFE	V	1	1	4	13
1984	JULY	ALEWIFE	V	1	2	0	8
1984	JULY	ALEWIFE	VI	1	1	14	11
1984	JULY	ALEWIFE	VI	1	1	7	0
1984	JULY	ALEWIFE	VI	1	2	10	8
1984	JULY	ALEWIFE	VI	2	1	24	22
1984	JULY	ALEWIFE	VI	2	1	3	1
1984	JULY	ALEWIFE	VI	2	2	14	24
1984	JULY	ALEWIFE	VI	2	2	4	3
1984	JULY	ALEWIFE	VI	3	1	34	25
1984	JULY	ALEWIFE	VI	3	2	22	28
1984	JULY	ALEWIFE	VI	4	1	20	79
1984	JULY	ALEWIFE	VI	4	2	22	6
1984	JULY	ALEWIFE	VI	4	2	22	13
1984	JULY	ALEWIFE	VI	5	1	21	79
1984	JULY	ALEWIFE	VI	5	1	35	59
1984	JULY	ALEWIFE	VI	5	2	33	20
1984	JULY	ALEWIFE	VI	5	2	34	116
1984	JULY	ALEWIFE	VII	1	1	2	7
1984	JULY	ALEWIFE	VII	1	2	2	11
1984	JULY	ALEWIFE	VII	2	1	2	28

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YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1984	JULY	ALEWIFE	VII	2	1	4	5
1984	JULY	ALEWIFE	VII	2	2	12	51
1984	JULY	ALEWIFE	VII	2	2	1	1
1984	JULY	ALEWIFE	VII	3	1	19	40
1984	JULY	ALEWIFE	VII	3	2	10	20
1984	JULY	ALEWIFE	VII	4	1	7	48
1984	JULY	ALEWIFE	VII	4	1	4	8
1984	JULY	ALEWIFE	VII	4	2	14	43
1984	JULY	ALEWIFE	VII	5	1	1	16
1984	JULY	ALEWIFE	VII	5	2	6	17
1984	JULY	ALEWIFE	VIII	1	1	3	4
1984	JULY	ALEWIFE	VIII	1	2	1	5
1984	JULY	ALEWIFE	VIII	2	1	3	31
1984	JULY	ALEWIFE	VIII	2	2	7	43
1984	JULY	ALEWIFE	VIII	3	1	11	56
1984	JULY	ALEWIFE	VIII	3	2	6	48
1984	JULY	ALEWIFE	VIII	4	1	12	28
1984	JULY	ALEWIFE	VIII	4	2	10	33
1984	JULY	ALEWIFE	VIII	5	1	6	22
1984	JULY	ALEWIFE	VIII	5	2	0	24
1984	JULY	ALEWIFE	IX	1	1	0	1
1984	JULY	ALEWIFE	IX	1	2	0	2
1984	JULY	ALEWIFE	IX	2	1	6	29
1984	JULY	ALEWIFE	IX	2	2	0	11
1984	JULY	ALEWIFE	IX	2	2	4	18
1984	JULY	ALEWIFE	IX	3	1	7	43
1984	JULY	ALEWIFE	IX	3	2	3	31
1984	JULY	ALEWIFE	IX	4	1	4	36
1984	JULY	ALEWIFE	IX	4	2	0	31
1984	JULY	ALEWIFE	IX	4	2	2	3
1984	JULY	ALEWIFE	IX	5	1	6	14
1984	JULY	ALEWIFE	IX	5	2	6	7
1984	AUGUST	ALEWIFE	I	1	2	0	5
1984	AUGUST	ALEWIFE	I	3	1	0	4
1984	AUGUST	ALEWIFE	I	3	2	0	3
1984	AUGUST	ALEWIFE	III	1	2	0	2
1984	AUGUST	ALEWIFE	III	2	1	0	1
1984	AUGUST	ALEWIFE	III	2	2	0	2
1984	AUGUST	ALEWIFE	III	3	1	0	1
1984	AUGUST	ALEWIFE	V	1	2	0	1
1984	AUGUST	ALEWIFE	V	1	2	0	1
1984	AUGUST	ALEWIFE	VI	1	2	0	2
1984	AUGUST	ALEWIFE	VI	3	1	0	1
1984	AUGUST	ALEWIFE	VI	3	2	0	1
1984	AUGUST	ALEWIFE	VI	4	1	0	2
1984	AUGUST	ALEWIFE	VII	2	2	0	1
1984	AUGUST	ALEWIFE	VII	3	2	0	1
1984	AUGUST	ALEWIFE	VII	3	2	0	1
1984	AUGUST	ALEWIFE	VII	4	2	0	1
1984	AUGUST	ALEWIFE	VIII	1	1	0	1
1984	AUGUST	ALEWIFE	VIII	3	1	0	1
1984	AUGUST	ALEWIFE	IX	3	1	0	1
1983	JUNE	GIZZARD SHAD	IV	1	1	0	4

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YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1983	JUNE	GIZZARD SHAD	IV	1	2	0	1
1983	JUNE	GIZZARD SHAD	V	1	1	2	7
1983	JUNE	GIZZARD SHAD	V	1	2	0	12
1983	JULY	GIZZARD SHAD	II	1	1	0	3
1983	JULY	GIZZARD SHAD	II	1	2	1	1
1983	JULY	GIZZARD SHAD	III	2	1	0	1
1983	AUGUST	GIZZARD SHAD	I	2	2	0	2
1983	AUGUST	GIZZARD SHAD	III	1	1	0	6
1983	AUGUST	GIZZARD SHAD	VII	3	1	0	1
1983	AUGUST	GIZZARD SHAD	IX	2	2	0	2
1984	JUNE	GIZZARD SHAD	II	1	1	0	23
1984	JUNE	GIZZARD SHAD	II	1	2	0	25
1984	JUNE	GIZZARD SHAD	IV	1	1	0	1
1984	JUNE	GIZZARD SHAD	V	1	1	0	59
1984	JUNE	GIZZARD SHAD	V	1	2	0	27
1984	JUNE	GIZZARD SHAD	VIII	2	1	0	1
1984	JULY	GIZZARD SHAD	I	1	1	0	1
1984	JULY	GIZZARD SHAD	I	1	2	2	0
1984	JULY	GIZZARD SHAD	II	1	1	0	15
1984	JULY	GIZZARD SHAD	IV	1	1	0	1
1984	JULY	GIZZARD SHAD	IV	1	2	0	1
1984	AUGUST	GIZZARD SHAD	II	1	1	0	7
1984	AUGUST	GIZZARD SHAD	II	1	2	0	13
1983	MAY	RAINBOW SMELT	I	2	2	1	0
1983	MAY	RAINBOW SMELT	II	1	2	1	1
1983	MAY	RAINBOW SMELT	III	1	1	1	0
1983	MAY	RAINBOW SMELT	III	2	2	4	0
1983	MAY	RAINBOW SMELT	III	3	1	1	0
1983	MAY	RAINBOW SMELT	III	3	2	2	0
1983	MAY	RAINBOW SMELT	VI	1	1	1	0
1983	MAY	RAINBOW SMELT	VI	2	2	1	0
1983	MAY	RAINBOW SMELT	VI	3	1	4	1
1983	MAY	RAINBOW SMELT	VI	3	2	11	1
1983	MAY	RAINBOW SMELT	VI	4	1	4	0
1983	MAY	RAINBOW SMELT	VI	4	2	1	0
1983	MAY	RAINBOW SMELT	VII	1	1	1	1
1983	MAY	RAINBOW SMELT	VII	2	1	5	0
1983	MAY	RAINBOW SMELT	VII	2	2	5	1
1983	MAY	RAINBOW SMELT	VII	3	1	7	2
1983	MAY	RAINBOW SMELT	VII	3	2	10	0
1983	MAY	RAINBOW SMELT	VII	4	1	4	0
1983	MAY	RAINBOW SMELT	VII	4	2	1	0
1983	MAY	RAINBOW SMELT	VII	5	1	1	0
1983	MAY	RAINBOW SMELT	VII	5	2	1	0
1983	MAY	RAINBOW SMELT	VIII	1	1	2	1
1983	MAY	RAINBOW SMELT	VIII	1	2	2	0
1983	MAY	RAINBOW SMELT	VIII	2	1	24	0
1983	MAY	RAINBOW SMELT	VIII	2	2	15	0
1983	MAY	RAINBOW SMELT	VIII	3	1	12	0
1983	MAY	RAINBOW SMELT	VIII	3	2	21	0
1983	MAY	RAINBOW SMELT	VIII	4	1	27	1
1983	MAY	RAINBOW SMELT	VIII	4	2	22	1
1983	MAY	RAINBOW SMELT	VIII	5	1	2	1

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YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1983	MAY	RAINBOW SMELT	VIII	5	2	2	0
1983	MAY	RAINBOW SMELT	IX	1	1	6	0
1983	MAY	RAINBOW SMELT	IX	1	2	3	2
1983	MAY	RAINBOW SMELT	IX	2	1	15	0
1983	MAY	RAINBOW SMELT	IX	2	2	22	0
1983	MAY	RAINBOW SMELT	IX	3	1	13	0
1983	MAY	RAINBOW SMELT	IX	3	2	11	1
1983	MAY	RAINBOW SMELT	IX	4	1	11	0
1983	MAY	RAINBOW SMELT	IX	4	2	19	0
1983	JUNE	RAINBOW SMELT	I	1	1	5	0
1983	JUNE	RAINBOW SMELT	I	1	2	2	0
1983	JUNE	RAINBOW SMELT	II	1	1	0	1
1983	JUNE	RAINBOW SMELT	III	1	2	1	0
1983	JUNE	RAINBOW SMELT	III	2	1	2	0
1983	JUNE	RAINBOW SMELT	III	2	2	2	0
1983	JUNE	RAINBOW SMELT	VI	3	1	0	1
1983	JUNE	RAINBOW SMELT	VI	3	2	0	1
1983	JUNE	RAINBOW SMELT	VI	4	1	0	1
1983	JUNE	RAINBOW SMELT	VI	4	2	1	0
1983	JUNE	RAINBOW SMELT	VI	4	2	1	0
1983	JUNE	RAINBOW SMELT	VII	3	1	1	0
1983	JUNE	RAINBOW SMELT	VIII	2	2	1	0
1983	JUNE	RAINBOW SMELT	VIII	3	1	1	0
1983	JUNE	RAINBOW SMELT	VIII	4	1	0	1
1983	JUNE	RAINBOW SMELT	IX	2	1	0	1
1983	JUNE	RAINBOW SMELT	IX	2	2	0	1
1983	JUNE	RAINBOW SMELT	IX	3	1	1	0
1984	JUNE	RAINBOW SMELT	I	1	1	4	0
1984	JUNE	RAINBOW SMELT	I	1	2	1	3
1984	JUNE	RAINBOW SMELT	I	2	1	1	2
1984	JUNE	RAINBOW SMELT	I	2	2	2	1
1984	JUNE	RAINBOW SMELT	I	3	1	0	1
1984	JUNE	RAINBOW SMELT	I	3	2	2	2
1984	JUNE	RAINBOW SMELT	III	1	2	3	1
1984	JUNE	RAINBOW SMELT	III	2	1	9	5
1984	JUNE	RAINBOW SMELT	III	2	2	2	2
1984	JUNE	RAINBOW SMELT	III	3	1	1	0
1984	JUNE	RAINBOW SMELT	III	3	2	2	1
1984	JUNE	RAINBOW SMELT	V	1	1	1	0
1984	JUNE	RAINBOW SMELT	VI	1	1	0	3
1984	JUNE	RAINBOW SMELT	VI	1	2	0	1
1984	JUNE	RAINBOW SMELT	VI	2	1	1	1
1984	JUNE	RAINBOW SMELT	VI	2	2	2	4
1984	JUNE	RAINBOW SMELT	VI	3	1	6	0
1984	JUNE	RAINBOW SMELT	VI	3	2	2	0
1984	JUNE	RAINBOW SMELT	VI	4	1	5	0
1984	JUNE	RAINBOW SMELT	VI	4	2	2	0
1984	JUNE	RAINBOW SMELT	VI	5	1	2	0
1984	JUNE	RAINBOW SMELT	VI	5	2	0	1
1984	JUNE	RAINBOW SMELT	VII	1	1	1	0
1984	JUNE	RAINBOW SMELT	VII	1	2	1	1
1984	JUNE	RAINBOW SMELT	VII	2	1	2	2
1984	JUNE	RAINBOW SMELT	VII	2	2	2	3

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YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1984	JUNE	RAINBOW SMELT	VII	3	1	1	2
1984	JUNE	RAINBOW SMELT	VII	3	2	1	1
1984	JUNE	RAINBOW SMELT	VII	4	1	2	2
1984	JUNE	RAINBOW SMELT	VII	4	2	1	1
1984	JUNE	RAINBOW SMELT	VII	5	2	0	1
1984	JUNE	RAINBOW SMELT	VIII	1	1	0	1
1984	JUNE	RAINBOW SMELT	VIII	1	2	1	0
1984	JUNE	RAINBOW SMELT	VIII	2	1	7	0
1984	JUNE	RAINBOW SMELT	VIII	2	2	2	1
1984	JUNE	RAINBOW SMELT	VIII	3	1	7	5
1984	JUNE	RAINBOW SMELT	VIII	3	2	6	0
1984	JUNE	RAINBOW SMELT	VIII	4	1	7	1
1984	JUNE	RAINBOW SMELT	VIII	4	2	5	1
1984	JUNE	RAINBOW SMELT	VIII	5	2	1	0
1984	JUNE	RAINBOW SMELT	IX	1	1	1	0
1984	JUNE	RAINBOW SMELT	IX	1	2	1	0
1984	JUNE	RAINBOW SMELT	IX	2	1	4	1
1984	JUNE	RAINBOW SMELT	IX	2	2	5	0
1984	JUNE	RAINBOW SMELT	IX	3	1	6	4
1984	JUNE	RAINBOW SMELT	IX	3	2	0	3
1984	JUNE	RAINBOW SMELT	IX	4	1	8	4
1984	JUNE	RAINBOW SMELT	IX	4	2	4	4
1984	JUNE	RAINBOW SMELT	IX	5	2	1	0
1984	JULY	RAINBOW SMELT	I	3	1	0	1
1984	JULY	RAINBOW SMELT	V	1	2	0	1
1984	JULY	RAINBOW SMELT	VI	1	2	0	3
1984	JULY	RAINBOW SMELT	VI	2	1	0	1
1984	JULY	RAINBOW SMELT	VI	2	2	0	2
1984	JULY	RAINBOW SMELT	VII	5	1	0	1
1983	MAY	BURBOT	III	1	1	1	0
1983	MAY	BURBOT	III	2	2	1	0
1983	MAY	BURBOT	VI	1	2	0	1
1983	MAY	BURBOT	VI	3	2	0	1
1983	MAY	BURBOT	VII	2	1	1	0
1983	MAY	BURBOT	VIII	1	1	1	0
1983	MAY	BURBOT	VIII	2	1	1	0
1983	MAY	BURBOT	VIII	2	2	1	0
1983	MAY	BURBOT	VIII	3	1	1	0
1983	MAY	BURBOT	VIII	3	2	1	0
1983	MAY	BURBOT	VIII	4	1	1	0
1983	MAY	BURBOT	IX	3	2	1	0
1983	MAY	BURBOT	IX	4	2	1	0
1983	JULY	BURBOT	V	1	1	0	1
1984	MAY	BURBOT	I	1	1	2	0
1984	MAY	BURBOT	III	1	2	1	0
1984	MAY	BURBOT	III	2	1	2	0
1984	MAY	BURBOT	IV	1	1	2	0
1984	MAY	BURBOT	VI	1	1	1	0
1984	MAY	BURBOT	VI	2	1	2	0
1984	MAY	BURBOT	VI	3	1	2	0
1984	MAY	BURBOT	VI	3	2	3	0
1984	MAY	BURBOT	VII	3	2	2	0
1984	MAY	BURBOT	VIII	1	2	2	0

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YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1984	MAY	BURBOT	VIII	2	1	2	0
1984	MAY	BURBOT	VIII	2	2	2	0
1984	MAY	BURBOT	VIII	3	1	2	0
1984	MAY	BURBOT	IX	1	2	1	0
1984	MAY	BURBOT	IX	3	1	1	0
1984	MAY	BURBOT	IX	4	1	1	0
1984	MAY	BURBOT	IX	4	2	2	0
1984	MAY	BURBOT	IX	5	1	1	0
1984	JULY	TROUT PERCH	I	2	2	0	1
1984	JULY	TROUT PERCH	III	1	2	0	1
1984	JULY	TROUT PERCH	III	2	2	0	1
1984	JULY	TROUT PERCH	III	3	2	0	1
1984	JULY	TROUT PERCH	VI	2	1	0	1
1984	JULY	TROUT PERCH	IX	4	1	0	1
1983	JUNE	WHITE PERCH	I	3	1	1	0
1983	JUNE	WHITE PERCH	IX	4	2	1	0
1984	JUNE	WHITE PERCH	II	1	1	0	1
1984	JUNE	WHITE PERCH	II	1	2	0	1
1984	JULY	WHITE PERCH	VII	3	2	1	0
1983	JUNE	FRESHWATER DRUM	II	1	2	1	0
1983	AUGUST	FRESHWATER DRUM	VII	4	1	1	0
1983	AUGUST	FRESHWATER DRUM	IX	4	2	1	0
1984	JUNE	FRESHWATER DRUM	II	1	1	0	32
1984	JUNE	FRESHWATER DRUM	II	1	2	18	1
1984	JUNE	FRESHWATER DRUM	VIII	2	2	1	0
1984	JULY	FRESHWATER DRUM	II	1	2	2	0
1984	JULY	FRESHWATER DRUM	VI	2	1	1	0
1983	AUGUST	BROOK SILVERSIDE	V	1	1	0	1
1983	MAY	CISCO	I	1	2	0	1
1984	JUNE	CARP	II	1	1	2	5
1984	JUNE	CARP	II	1	2	5	3
1984	JULY	CARP	VI	1	1	1	0
1984	JULY	CARP	VII	1	1	1	0
1984	JULY	CARP	VII	2	1	1	0
1984	JULY	CARP	VII	3	1	4	0
1984	JULY	CARP	VII	3	2	2	0
1984	JULY	CARP	VII	4	2	1	0
1984	JULY	CARP	VIII	3	1	5	0
1984	JULY	CARP	VIII	4	1	1	0
1984	JULY	CARP	VIII	4	2	3	0
1984	JULY	CARP	VIII	5	1	1	0
1984	JULY	CARP	VIII	5	2	1	0
1984	JULY	CARP	IX	2	1	2	0
1984	JULY	CARP	IX	3	1	1	0
1984	JULY	CARP	IX	4	2	1	0
1983	JULY	WHITE SUCKER	III	2	2	0	1
1983	JULY	WHITE SUCKER	VI	3	2	0	1
1983	JULY	WHITE SUCKER	VII	4	2	0	3
1983	JULY	WHITE SUCKER	VIII	2	1	0	2
1983	JULY	WHITE SUCKER	VIII	3	2	0	1
1984	JUNE	WHITE SUCKER	I	1	1	0	1
1984	JUNE	WHITE SUCKER	III	2	2	0	1
1984	JUNE	WHITE SUCKER	III	3	1	1	0

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YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1984	JUNE	WHITE SUCKER	VI	2	1	1	0
1984	JUNE	WHITE SUCKER	IX	3	2	0	1
1984	JULY	WHITE SUCKER	VI	2	1	1	0
1984	JULY	WHITE SUCKER	VI	5	1	0	2
1984	JULY	WHITE SUCKER	VI	5	2	0	10
1984	JULY	WHITE SUCKER	VII	5	2	0	1
1983	JUNE	EMERALD SHINER	V	1	1	1	0
1983	JULY	EMERALD SHINER	II	1	2	2	0
1983	JULY	EMERALD SHINER	VII	3	1	2	0
1983	JULY	EMERALD SHINER	VII	3	2	1	0
1983	JULY	EMERALD SHINER	IX	2	1	1	0
1983	JULY	EMERALD SHINER	IX	3	1	1	0
1983	AUGUST	EMERALD SHINER	V	1	1	0	1
1983	AUGUST	EMERALD SHINER	VI	1	1	0	2
1983	AUGUST	EMERALD SHINER	VI	2	2	0	1
1983	AUGUST	EMERALD SHINER	VI	5	2	2	0
1983	AUGUST	EMERALD SHINER	VII	5	2	0	1
1983	AUGUST	EMERALD SHINER	VIII	1	1	0	1
1983	AUGUST	EMERALD SHINER	VIII	2	1	0	2
1983	AUGUST	EMERALD SHINER	VIII	2	2	0	1
1983	AUGUST	EMERALD SHINER	VIII	3	1	0	2
1983	AUGUST	EMERALD SHINER	IX	1	2	0	1
1983	AUGUST	EMERALD SHINER	IX	4	1	0	2
1983	AUGUST	EMERALD SHINER	IX	4	2	0	1
1984	JUNE	EMERALD SHINER	II	1	1	26	85
1984	JUNE	EMERALD SHINER	II	1	1	1	15
1984	JUNE	EMERALD SHINER	II	1	2	19	47
1984	JUNE	EMERALD SHINER	IV	1	1	0	1
1984	JUNE	EMERALD SHINER	IV	1	2	0	1
1984	JUNE	EMERALD SHINER	V	1	1	0	2
1984	JUNE	EMERALD SHINER	V	1	2	0	7
1984	JUNE	EMERALD SHINER	VIII	4	2	0	1
1984	JUNE	EMERALD SHINER	IX	1	1	0	1
1984	JULY	EMERALD SHINER	I	3	1	0	1
1984	JULY	EMERALD SHINER	II	1	1	0	1
1984	JULY	EMERALD SHINER	II	1	1	0	8
1984	JULY	EMERALD SHINER	IV	1	2	0	1
1984	JULY	EMERALD SHINER	V	1	2	0	1
1984	JULY	EMERALD SHINER	VI	1	2	0	1
1984	JULY	EMERALD SHINER	VI	5	2	0	1
1984	JULY	EMERALD SHINER	IX	3	2	1	0
1984	JULY	EMERALD SHINER	IX	5	1	1	0
1984	AUGUST	EMERALD SHINER	I	2	2	0	1
1984	AUGUST	EMERALD SHINER	I	3	1	0	4
1984	AUGUST	EMERALD SHINER	I	3	2	0	1
1984	AUGUST	EMERALD SHINER	II	1	1	0	1
1984	AUGUST	EMERALD SHINER	II	1	2	0	1
1984	AUGUST	EMERALD SHINER	IV	1	1	0	1
1984	AUGUST	EMERALD SHINER	IV	1	2	0	3
1984	AUGUST	EMERALD SHINER	V	1	1	0	3
1984	AUGUST	EMERALD SHINER	V	1	2	0	11
1984	AUGUST	EMERALD SHINER	VI	1	1	0	15
1984	AUGUST	EMERALD SHINER	VI	2	1	0	1

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YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1984	AUGUST	EMERALD SHINER	VI	2	2	0	4
1984	AUGUST	EMERALD SHINER	VI	3	1	0	5
1984	AUGUST	EMERALD SHINER	VI	3	2	0	1
1984	AUGUST	EMERALD SHINER	VI	5	1	0	2
1984	AUGUST	EMERALD SHINER	VII	3	1	0	1
1984	AUGUST	EMERALD SHINER	VII	4	2	0	1
1984	AUGUST	EMERALD SHINER	VII	5	2	0	1
1984	AUGUST	EMERALD SHINER	VIII	5	1	0	1
1984	AUGUST	EMERALD SHINER	VIII	5	2	0	2
1984	AUGUST	EMERALD SHINER	IX	2	2	0	1
1984	AUGUST	EMERALD SHINER	IX	3	1	0	3
1983	AUGUST	SPOTTAIL SHINER	I	1	2	1	0
1983	AUGUST	SPOTTAIL SHINER	II	1	2	0	1
1983	AUGUST	SPOTTAIL SHINER	VI	2	1	0	1
1983	AUGUST	SPOTTAIL SHINER	VI	2	2	1	0
1983	AUGUST	SPOTTAIL SHINER	VII	2	1	1	0
1983	AUGUST	SPOTTAIL SHINER	VII	4	2	0	1
1983	AUGUST	SPOTTAIL SHINER	VIII	1	1	0	1
1983	AUGUST	SPOTTAIL SHINER	VIII	1	2	0	1
1983	AUGUST	SPOTTAIL SHINER	VIII	5	1	1	0
1983	AUGUST	SPOTTAIL SHINER	VIII	5	2	0	1
1983	AUGUST	SPOTTAIL SHINER	IX	2	2	1	0
1983	AUGUST	SPOTTAIL SHINER	IX	4	1	0	1
1984	JUNE	SPOTTAIL SHINER	III	1	2	1	0
1984	JUNE	SPOTTAIL SHINER	VI	5	2	1	0
1984	JULY	SPOTTAIL SHINER	III	2	1	1	0
1984	JULY	SPOTTAIL SHINER	VI	4	2	0	1
1984	JULY	SPOTTAIL SHINER	VI	5	1	1	3
1984	JULY	SPOTTAIL SHINER	VI	5	2	2	7
1984	JULY	SPOTTAIL SHINER	IX	3	2	1	0
1984	AUGUST	SAND SHINER	VI	4	2	1	0
1984	AUGUST	MIMIC SHINER	VIII	3	2	0	1
1983	JULY	UNKNOWN MINNOW	I	1	2	0	1
1984	AUGUST	ROCK BASS	IX	1	2	0	1
1983	AUGUST	PUMKINSEED	II	1	2	0	1
1983	AUGUST	WHITE CRAPPIE	V	1	2	0	1
1984	JUNE	WHITE CRAPPIE	II	1	1	0	3
1984	JULY	WHITE CRAPPIE	II	1	1	0	2
1984	JULY	WHITE CRAPPIE	II	1	2	0	1
1984	JULY	WHITE CRAPPIE	IV	1	1	0	1
1984	JULY	WHITE CRAPPIE	VIII	2	2	0	1
1984	JULY	WHITE CRAPPIE	VIII	3	1	0	1
1983	AUGUST	JOHNNY DARTER	VII	4	1	0	1
1984	JUNE	JOHNNY DARTER	VIII	2	2	2	0
1984	JULY	JOHNNY DARTER	VI	3	2	0	1
1984	JULY	JOHNNY DARTER	VI	5	1	0	1
1984	JULY	JOHNNY DARTER	VI	5	2	0	2
1984	JULY	JOHNNY DARTER	VII	1	2	0	1
1983	JUNE	LOG PERCH	I	1	1	1	0
1983	JUNE	LOG PERCH	I	2	1	1	0
1983	JUNE	LOG PERCH	I	2	1	2	0
1983	JUNE	LOG PERCH	II	1	2	1	0
1983	JUNE	LOG PERCH	III	2	1	5	0

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YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1983	JUNE	LOG PERCH	III	2	2	14	0
1983	JUNE	LOG PERCH	III	3	1	1	0
1983	JUNE	LOG PERCH	VI	3	2	6	0
1983	JUNE	LOG PERCH	IX	3	2	3	0
1983	JULY	LOG PERCH	III	2	2	1	0
1983	JULY	LOG PERCH	VI	2	1	6	0
1983	JULY	LOG PERCH	VI	3	2	2	0
1983	JULY	LOG PERCH	VII	2	1	2	0
1983	JULY	LOG PERCH	VIII	1	2	1	0
1983	JULY	LOG PERCH	VIII	4	2	1	0
1983	JULY	LOG PERCH	IX	2	2	2	0
1983	JULY	LOG PERCH	IX	3	1	1	0
1983	JULY	LOG PERCH	IX	5	1	1	0
1984	JUNE	LOG PERCH	I	1	1	4	0
1984	JUNE	LOG PERCH	I	2	1	7	0
1984	JUNE	LOG PERCH	I	2	2	1	0
1984	JUNE	LOG PERCH	II	1	1	0	1
1984	JUNE	LOG PERCH	III	1	1	1	0
1984	JUNE	LOG PERCH	III	2	1	15	0
1984	JUNE	LOG PERCH	III	2	2	13	0
1984	JUNE	LOG PERCH	III	3	1	8	0
1984	JUNE	LOG PERCH	III	3	2	11	0
1984	JUNE	LOG PERCH	VI	1	2	3	0
1984	JUNE	LOG PERCH	VI	2	1	9	0
1984	JUNE	LOG PERCH	VI	2	2	10	0
1984	JUNE	LOG PERCH	VI	3	1	17	0
1984	JUNE	LOG PERCH	VI	3	2	9	0
1984	JUNE	LOG PERCH	VI	4	1	[illegible]	0
1984	JUNE	LOG PERCH	VI	4	2	13	0
1984	JUNE	LOG PERCH	VI	5	2	2	0
1984	JUNE	LOG PERCH	VII	2	1	44	0
1984	JUNE	LOG PERCH	VII	2	2	38	0
1984	JUNE	LOG PERCH	VII	3	1	17	1
1984	JUNE	LOG PERCH	VII	4	1	14	0
1984	JUNE	LOG PERCH	VII	4	2	17	0
1984	JUNE	LOG PERCH	VIII	1	1	1	0
1984	JUNE	LOG PERCH	VIII	1	2	1	0
1984	JUNE	LOG PERCH	VIII	2	1	10	0
1984	JUNE	LOG PERCH	VIII	2	2	20	0
1984	JUNE	LOG PERCH	VIII	3	1	12	0
1984	JUNE	LOG PERCH	VIII	3	2	14	0
1984	JUNE	LOG PERCH	VIII	4	1	19	0
1984	JUNE	LOG PERCH	VIII	4	2	26	3
1984	JUNE	LOG PERCH	VIII	5	1	3	0
1984	JUNE	LOG PERCH	IX	1	1	12	0
1984	JUNE	LOG PERCH	IX	2	2	9	0
1984	JUNE	LOG PERCH	IX	3	1	9	0
1984	JUNE	LOG PERCH	IX	3	2	23	0
1984	JUNE	LOG PERCH	IX	4	1	21	0
1984	JUNE	LOG PERCH	IX	4	2	17	0
1984	JULY	LOG PERCH	I	3	1	1	0
1984	JULY	LOG PERCH	III	2	1	4	0
1984	JULY	LOG PERCH	III	3	1	1	0

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YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1984	JULY	LOG PERCH	III	3	2	3	0
1984	JULY	LOG PERCH	V	1	1	1	2
1984	JULY	LOG PERCH	V	1	2	2	0
1984	JULY	LOG PERCH	VI	1	2	11	0
1984	JULY	LOG PERCH	VI	2	1	13	0
1984	JULY	LOG PERCH	VI	2	2	11	2
1984	JULY	LOG PERCH	VI	3	1	1	0
1984	JULY	LOG PERCH	VI	3	2	3	0
1984	JULY	LOG PERCH	VI	4	2	1	0
1984	JULY	LOG PERCH	VII	2	2	1	0
1984	JULY	LOG PERCH	VII	3	1	6	0
1984	JULY	LOG PERCH	VII	3	2	2	0
1984	JULY	LOG PERCH	VII	4	2	3	0
1984	JULY	LOG PERCH	VIII	4	1	4	0
1984	JULY	LOG PERCH	VIII	5	1	1	0
1984	JULY	LOG PERCH	VIII	5	2	1	0
1984	JULY	LOG PERCH	IX	2	2	1	0
1984	JULY	LOG PERCH	IX	4	2	3	0
1983	MAY	UNKNOWN DARTER	V	1	2	1	0
1983	JUNE	UNKNOWN DARTER	I	1	2	1	0
1983	JUNE	UNKNOWN DARTER	III	1	2	1	0
1983	JUNE	UNKNOWN DARTER	IV	1	1	1	0
1983	JUNE	UNKNOWN DARTER	VI	2	2	1	0
1983	JUNE	UNKNOWN DARTER	VI	3	1	6	0
1983	JUNE	UNKNOWN DARTER	VI	4	1	22	0
1983	JUNE	UNKNOWN DARTER	VI	4	2	1	0
1983	JUNE	UNKNOWN DARTER	VII	2	1	7	0
1983	JUNE	UNKNOWN DARTER	VII	2	2	10	0
1983	JUNE	UNKNOWN DARTER	VII	3	1	25	0
1983	JUNE	UNKNOWN DARTER	VII	3	2	19	0
1983	JUNE	UNKNOWN DARTER	VII	4	2	7	0
1983	JUNE	UNKNOWN DARTER	VIII	1	1	2	0
1983	JUNE	UNKNOWN DARTER	VIII	2	1	8	0
1983	JUNE	UNKNOWN DARTER	VIII	2	2	2	1
1983	JUNE	UNKNOWN DARTER	VIII	3	1	0	2
1983	JUNE	UNKNOWN DARTER	VIII	3	2	4	0
1983	JUNE	UNKNOWN DARTER	VIII	4	1	3	0
1983	JUNE	UNKNOWN DARTER	VIII	4	2	9	0
1983	JUNE	UNKNOWN DARTER	IX	2	1	12	0
1983	JUNE	UNKNOWN DARTER	IX	2	1	23	0
1983	JUNE	UNKNOWN DARTER	IX	2	2	2	0
1983	JUNE	UNKNOWN DARTER	IX	2	2	4	0
1983	JUNE	UNKNOWN DARTER	IX	3	1	11	0
1983	JUNE	UNKNOWN DARTER	IX	3	2	1	0
1983	JUNE	UNKNOWN DARTER	IX	4	1	1	0
1983	JUNE	UNKNOWN DARTER	IX	4	2	6	0
1983	JULY	UNKNOWN DARTER	II	1	2	1	0
1983	JULY	UNKNOWN DARTER	VI	2	2	3	0
1983	JULY	UNKNOWN DARTER	VII	2	1	2	0
1983	JULY	UNKNOWN DARTER	VII	2	2	2	0
1983	JULY	UNKNOWN DARTER	VII	3	1	4	0
1983	JULY	UNKNOWN DARTER	VII	3	2	5	0
1983	JULY	UNKNOWN DARTER	VIII	4	2	0	1

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YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1983	JULY	UNKNOWN DARTER	IX	2	1	3	0
1983	AUGUST	UNKNOWN DARTER	I	1	1	1	0
1983	AUGUST	UNKNOWN DARTER	III	2	1	2	0
1983	AUGUST	UNKNOWN DARTER	III	2	2	2	0
1983	AUGUST	UNKNOWN DARTER	III	3	2	1	0
1983	AUGUST	UNKNOWN DARTER	III	3	2	4	1
1983	AUGUST	UNKNOWN DARTER	VI	2	1	1	0
1983	AUGUST	UNKNOWN DARTER	VI	3	1	2	0
1983	AUGUST	UNKNOWN DARTER	VI	3	2	3	0
1983	AUGUST	UNKNOWN DARTER	VII	2	2	2	0
1983	AUGUST	UNKNOWN DARTER	VII	3	1	1	0
1983	AUGUST	UNKNOWN DARTER	VII	3	2	1	0
1983	AUGUST	UNKNOWN DARTER	VII	4	1	1	0
1983	AUGUST	UNKNOWN DARTER	VIII	2	1	1	0
1983	AUGUST	UNKNOWN DARTER	IX	3	2	3	0
1984	JUNE	UNKNOWN DARTER	VI	1	1	6	0
1984	JUNE	UNKNOWN DARTER	VII	3	2	28	0
1984	JUNE	UNKNOWN DARTER	VII	4	1	0	1
1984	JUNE	UNKNOWN DARTER	VII	4	2	2	0
1984	JUNE	UNKNOWN DARTER	IX	1	2	5	0
1984	JUNE	UNKNOWN DARTER	IX	2	1	12	0
1984	JUNE	UNKNOWN DARTER	IX	4	2	4	0
1984	JULY	UNKNOWN DARTER	VI	4	1	1	0
1984	JULY	UNKNOWN DARTER	VIII	2	2	1	0
1984	AUGUST	UNKNOWN DARTER	III	2	1	1	1
1984	AUGUST	UNKNOWN DARTER	VII	3	2	3	0
1984	AUGUST	UNKNOWN DARTER	IX	3	1	1	0
1984	AUGUST	UNKNOWN DARTER	IX	4	1	1	0
1983	MAY	YELLOW PERCH	IV	1	1	1	0
1983	AUGUST	YELLOW PERCH	VII	3	2	1	0
1984	MAY	YELLOW PERCH	II	1	1	1	0
1984	MAY	YELLOW PERCH	IV	1	1	1	0
1984	MAY	YELLOW PERCH	IV	1	2	1	0
1984	MAY	YELLOW PERCH	V	1	1	5	0
1984	MAY	YELLOW PERCH	V	1	2	4	0
1984	JUNE	YELLOW PERCH	I	1	2	1	2
1984	JUNE	YELLOW PERCH	I	2	2	1	0
1984	JUNE	YELLOW PERCH	III	1	2	1	0
1984	JUNE	YELLOW PERCH	III	2	1	0	1
1984	JUNE	YELLOW PERCH	VI	2	1	3	0
1984	JUNE	YELLOW PERCH	VI	3	1	2	0
1984	JUNE	YELLOW PERCH	VII	3	2	0	1
1984	JUNE	YELLOW PERCH	VIII	3	2	4	0
1984	JUNE	YELLOW PERCH	IX	2	1	1	0
1984	JUNE	YELLOW PERCH	IX	3	1	0	2
1984	JUNE	YELLOW PERCH	IX	4	1	0	1
1984	JULY	YELLOW PERCH	VI	2	2	0	1
1984	JULY	YELLOW PERCH	VIII	3	1	0	1
1984	JULY	YELLOW PERCH	VIII	5	2	0	1
1983	JULY	MOTTLED SCULPIN	III	2	1	0	1
1983	APRIL	DEEPWATER SCULPIN	I	1	1	0	1
1983	APRIL	DEEPWATER SCULPIN	I	2	2	0	1
1983	APRIL	DEEPWATER SCULPIN	III	1	1	0	1

RIVER=ST. CLAIR

YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1983	APRIL	DEEPWATER SCULPIN	III	2	1	0	1
1983	APRIL	DEEPWATER SCULPIN	VI	1	2	0	1
1983	APRIL	DEEPWATER SCULPIN	VI	2	1	0	1
1983	APRIL	DEEPWATER SCULPIN	VII	2	1	0	2
1983	APRIL	DEEPWATER SCULPIN	VIII	2	1	0	1
1983	APRIL	DEEPWATER SCULPIN	IX	3	1	0	1
1983	MAY	DEEPWATER SCULPIN	VI	3	2	0	1
1983	MAY	DEEPWATER SCULPIN	VIII	3	1	0	1
1983	MAY	DEEPWATER SCULPIN	VIII	3	2	0	1
1983	MAY	DEEPWATER SCULPIN	VIII	4	2	1	0
1983	MAY	DEEPWATER SCULPIN	VIII	5	1	0	1
1984	MAY	DEEPWATER SCULPIN	III	2	1	0	1
1984	MAY	DEEPWATER SCULPIN	VIII	1	2	0	1
1984	MAY	DEEPWATER SCULPIN	VIII	3	2	0	3
1984	MAY	DEEPWATER SCULPIN	VIII	4	2	0	1
1984	MAY	DEEPWATER SCULPIN	IX	3	1	0	2
1983	MAY	UNKNOWN	VIII	2	2	1	0
1983	MAY	UNKNOWN	VIII	4	1	2	0
1983	MAY	UNKNOWN	VIII	5	1	1	0
1983	MAY	UNKNOWN	IX	4	2	1	0
1983	JUNE	UNKNOWN	II	1	1	1	0
1983	JUNE	UNKNOWN	II	1	2	3	0
1983	JUNE	UNKNOWN	VI	4	2	1	0
1983	JUNE	UNKNOWN	VIII	3	2	2	0
1983	JUNE	UNKNOWN	IX	3	2	1	0
1983	JULY	UNKNOWN	I	2	1	4	1
1983	JULY	UNKNOWN	I	3	1	0	1
1983	JULY	UNKNOWN	III	1	1	1	0
1983	JULY	UNKNOWN	VI	1	1	0	1
1983	JULY	UNKNOWN	VI	5	2	1	0
1983	JULY	UNKNOWN	VII	3	2	0	1
1983	JULY	UNKNOWN	IX	4	2	1	0
1983	AUGUST	UNKNOWN	I	2	2	0	1
1984	JUNE	UNKNOWN	II	1	2	0	2
1984	JUNE	UNKNOWN	V	1	2	0	2
1984	JUNE	UNKNOWN	VIII	3	2	1	0
1984	JUNE	UNKNOWN	VIII	4	2	0	1
1984	JUNE	UNKNOWN	IX	5	1	1	0
1984	JULY	UNKNOWN	I	1	2	0	1
1984	JULY	UNKNOWN	VI	4	2	0	1
1984	JULY	UNKNOWN	VII	2	2	0	1

RIVER=DETROIT

YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	N/S
1983	JUNE	ALEWIFE	XI	1	2	0	1
1983	JUNE	ALEWIFE	XII	1	2	0	1
1983	JUNE	ALEWIFE	XIII	1	1	0	1
1983	JUNE	ALEWIFE	XIV	3	2	1	0
1983	JUNE	ALEWIFE	XIV	4	1	0	1
1983	JUNE	ALEWIFE	XIV	4	2	0	1
1983	JUNE	ALEWIFE	XIV	5	1	0	1
1983	JUNE	ALEWIFE	XIV	5	2	0	1
1983	JUNE	ALEWIFE	XV	1	1	0	1
1983	JUNE	ALEWIFE	XV	4	1	0	1
1983	JUNE	ALEWIFE	XV	5	2	2	0
1983	JULY	ALEWIFE	X	1	1	2	15
1983	JULY	ALEWIFE	X	1	2	3	9
1983	JULY	ALEWIFE	X	2	1	0	2
1983	JULY	ALEWIFE	X	2	2	1	2
1983	JULY	ALEWIFE	X	3	1	0	10
1983	JULY	ALEWIFE	X	3	2	0	10
1983	JULY	ALEWIFE	X	4	2	0	2
1983	JULY	ALEWIFE	XI	1	1	1	67
1983	JULY	ALEWIFE	XI	1	2	13	55
1983	JULY	ALEWIFE	XI	2	1	0	4
1983	JULY	ALEWIFE	XI	2	2	0	3
1983	JULY	ALEWIFE	XI	3	1	0	7
1983	JULY	ALEWIFE	XI	3	2	0	8
1983	JULY	ALEWIFE	XII	1	1	1	39
1983	JULY	ALEWIFE	XII	1	2	0	62
1983	JULY	ALEWIFE	XIII	1	1	0	10
1983	JULY	ALEWIFE	XIII	1	2	1	8
1983	JULY	ALEWIFE	XIII	2	1	0	14
1983	JULY	ALEWIFE	XIII	2	2	1	19
1983	JULY	ALEWIFE	XIII	3	1	1	5
1983	JULY	ALEWIFE	XIII	3	2	0	6
1983	JULY	ALEWIFE	XIII	4	1	0	4
1983	JULY	ALEWIFE	XIV	1	1	0	9
1983	JULY	ALEWIFE	XIV	1	2	1	12
1983	JULY	ALEWIFE	XIV	2	1	0	19
1983	JULY	ALEWIFE	XIV	2	2	1	22
1983	JULY	ALEWIFE	XIV	3	1	1	23
1983	JULY	ALEWIFE	XIV	3	2	0	23
1983	JULY	ALEWIFE	XIV	4	1	1	12
1983	JULY	ALEWIFE	XIV	4	2	2	9
1983	JULY	ALEWIFE	XIV	5	1	0	22
1983	JULY	ALEWIFE	XIV	5	2	0	15
1983	JULY	ALEWIFE	XV	1	1	1	7
1983	JULY	ALEWIFE	XV	1	2	1	17
1983	JULY	ALEWIFE	XV	2	1	0	8
1983	JULY	ALEWIFE	XV	2	2	1	4
1983	JULY	ALEWIFE	XV	3	1	3	12
1983	JULY	ALEWIFE	XV	3	2	2	4
1983	JULY	ALEWIFE	XV	4	1	0	8
1983	JULY	ALEWIFE	XV	4	2	0	4
1983	JULY	ALEWIFE	XV	5	1	0	6
1983	JULY	ALEWIFE	XV	5	2	1	7
1983	AUGUST	ALEWIFE	X	1	1	0	1

RIVER=DETROIT

YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1983	AUGUST	ALEWIFE	X	1	2	0	1
1983	AUGUST	ALEWIFE	X	2	1	0	1
1983	AUGUST	ALEWIFE	X	2	2	0	1
1983	AUGUST	ALEWIFE	X	3	1	0	2
1983	AUGUST	ALEWIFE	XI	1	2	0	2
1983	AUGUST	ALEWIFE	XI	2	2	0	1
1983	AUGUST	ALEWIFE	XI	3	1	0	1
1983	AUGUST	ALEWIFE	XIII	2	1	0	1
1983	AUGUST	ALEWIFE	XIV	2	1	0	2
1983	AUGUST	ALEWIFE	XIV	3	1	0	2
1983	AUGUST	ALEWIFE	XV	2	2	0	1
1983	AUGUST	ALEWIFE	XV	3	1	0	2
1983	AUGUST	ALEWIFE	XV	3	2	0	1
1983	AUGUST	ALEWIFE	XV	4	2	0	1
1983	AUGUST	ALEWIFE	XV	5	1	0	2
1983	AUGUST	ALEWIFE	XV	5	2	0	1
1984	JUNE	ALEWIFE	X	1	1	1	1
1984	JUNE	ALEWIFE	X	1	2	1	11
1984	JUNE	ALEWIFE	X	2	1	1	5
1984	JUNE	ALEWIFE	X	3	1	0	3
1984	JUNE	ALEWIFE	X	3	2	0	6
1984	JUNE	ALEWIFE	X	4	1	0	1
1984	JUNE	ALEWIFE	X	4	2	0	2
1984	JUNE	ALEWIFE	XI	1	1	0	9
1984	JUNE	ALEWIFE	XI	1	2	0	12
1984	JUNE	ALEWIFE	XI	2	1	0	3
1984	JUNE	ALEWIFE	XI	2	2	0	4
1984	JUNE	ALEWIFE	XI	3	1	0	2
1984	JUNE	ALEWIFE	XI	3	2	2	2
1984	JUNE	ALEWIFE	XII	1	1	0	7
1984	JUNE	ALEWIFE	XII	1	2	1	4
1984	JUNE	ALEWIFE	XIII	1	2	0	3
1984	JUNE	ALEWIFE	XIII	2	1	0	12
1984	JUNE	ALEWIFE	XIII	2	2	0	10
1984	JUNE	ALEWIFE	XIII	3	1	0	4
1984	JUNE	ALEWIFE	XIII	3	2	0	2
1984	JUNE	ALEWIFE	XIII	3	2	0	3
1984	JUNE	ALEWIFE	XIII	4	1	1	0
1984	JUNE	ALEWIFE	XIII	4	2	2	0
1984	JUNE	ALEWIFE	XIV	1	2	0	1
1984	JUNE	ALEWIFE	XIV	2	1	0	5
1984	JUNE	ALEWIFE	XIV	2	2	0	4
1984	JUNE	ALEWIFE	XIV	3	1	0	2
1984	JUNE	ALEWIFE	XIV	3	2	0	4
1984	JUNE	ALEWIFE	XIV	4	1	1	5
1984	JUNE	ALEWIFE	XIV	5	1	0	4
1984	JUNE	ALEWIFE	XIV	5	2	0	9
1984	JUNE	ALEWIFE	XV	1	1	0	5
1984	JUNE	ALEWIFE	XV	1	2	0	5
1984	JUNE	ALEWIFE	XV	2	1	0	1
1984	JUNE	ALEWIFE	XV	2	2	0	2
1984	JUNE	ALEWIFE	XV	3	1	2	3
1984	JUNE	ALEWIFE	XV	3	2	1	7

RIVER=DETROIT

YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1984	JUNE	ALEWIFE	XV	4	1	0	2
1984	JUNE	ALEWIFE	XV	4	2	0	3
1984	JUNE	ALEWIFE	XV	5	1	0	2
1984	JUNE	ALEWIFE	XV	5	2	1	1
1984	JULY	ALEWIFE	X	1	1	0	20
1984	JULY	ALEWIFE	X	1	2	0	5
1984	JULY	ALEWIFE	X	2	1	0	13
1984	JULY	ALEWIFE	X	2	2	0	9
1984	JULY	ALEWIFE	X	3	2	0	6
1984	JULY	ALEWIFE	X	4	1	0	3
1984	JULY	ALEWIFE	X	4	2	0	1
1984	JULY	ALEWIFE	XI	1	1	0	11
1984	JULY	ALEWIFE	XI	1	2	0	9
1984	JULY	ALEWIFE	XI	2	1	0	29
1984	JULY	ALEWIFE	XI	2	2	0	29
1984	JULY	ALEWIFE	XI	3	1	0	7
1984	JULY	ALEWIFE	XI	3	2	0	5
1984	JULY	ALEWIFE	XII	1	1	0	34
1984	JULY	ALEWIFE	XII	1	2	0	23
1984	JULY	ALEWIFE	XIII	1	1	0	2
1984	JULY	ALEWIFE	XIII	1	2	0	12
1984	JULY	ALEWIFE	XIII	2	1	0	56
1984	JULY	ALEWIFE	XIII	2	2	0	31
1984	JULY	ALEWIFE	XIII	2	2	0	12
1984	JULY	ALEWIFE	XIII	3	1	0	2
1984	JULY	ALEWIFE	XIII	4	1	0	1
1984	JULY	ALEWIFE	XIII	4	2	0	5
1984	JULY	ALEWIFE	XIV	1	1	0	11
1984	JULY	ALEWIFE	XIV	1	2	0	16
1984	JULY	ALEWIFE	XIV	2	1	0	15
1984	JULY	ALEWIFE	XIV	2	2	0	17
1984	JULY	ALEWIFE	XIV	3	1	0	1
1984	JULY	ALEWIFE	XIV	3	2	0	1
1984	JULY	ALEWIFE	XIV	4	1	0	2
1984	JULY	ALEWIFE	XIV	4	2	0	4
1984	JULY	ALEWIFE	XIV	5	1	0	8
1984	JULY	ALEWIFE	XIV	5	2	0	11
1984	JULY	ALEWIFE	XV	1	1	0	22
1984	JULY	ALEWIFE	XV	1	2	0	13
1984	JULY	ALEWIFE	XV	2	1	0	12
1984	JULY	ALEWIFE	XV	2	2	0	12
1984	JULY	ALEWIFE	XV	3	1	0	12
1984	JULY	ALEWIFE	XV	3	2	0	11
1984	JULY	ALEWIFE	XV	4	1	0	6
1984	JULY	ALEWIFE	XV	4	2	0	4
1984	JULY	ALEWIFE	XV	5	1	0	44
1984	JULY	ALEWIFE	XV	5	2	0	21
1984	AUGUST	ALEWIFE	X	2	2	0	1
1984	AUGUST	ALEWIFE	XIII	4	1	0	1
1984	AUGUST	ALEWIFE	XIII	4	2	0	1
1984	AUGUST	ALEWIFE	XV	2	1	0	1
1984	AUGUST	ALEWIFE	XV	5	2	0	2
1983	JUNE	GIZZARD SHAD	XIII	4	2	0	1

RIVER=DETROIT

YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1983	JUNE	GIZZARD SHAD	XIV	5	1	9	1
1983	JUNE	GIZZARD SHAD	XIV	5	2	6	0
1983	JUNE	GIZZARD SHAD	XV	1	1	12	0
1983	JUNE	GIZZARD SHAD	XV	1	2	16	0
1983	JUNE	GIZZARD SHAD	XV	4	1	1	0
1983	JULY	GIZZARD SHAD	X	1	1	0	10
1983	JULY	GIZZARD SHAD	X	1	2	0	9
1983	JULY	GIZZARD SHAD	X	4	1	0	3
1983	JULY	GIZZARD SHAD	XI	1	1	0	32
1983	JULY	GIZZARD SHAD	XI	1	2	0	34
1983	JULY	GIZZARD SHAD	XII	1	1	0	40
1983	JULY	GIZZARD SHAD	XII	1	2	0	50
1983	JULY	GIZZARD SHAD	XIII	1	1	0	11
1983	JULY	GIZZARD SHAD	XIII	1	2	0	3
1983	JULY	GIZZARD SHAD	XIII	2	1	0	6
1983	JULY	GIZZARD SHAD	XIII	2	2	0	5
1983	JULY	GIZZARD SHAD	XIII	3	1	2	0
1983	JULY	GIZZARD SHAD	XIII	4	1	0	1
1983	JULY	GIZZARD SHAD	XIII	4	2	0	2
1983	JULY	GIZZARD SHAD	XIV	1	1	2	6
1983	JULY	GIZZARD SHAD	XIV	1	2	5	0
1983	JULY	GIZZARD SHAD	XIV	2	1	5	2
1983	JULY	GIZZARD SHAD	XIV	2	2	7	5
1983	JULY	GIZZARD SHAD	XIV	3	2	4	4
1983	JULY	GIZZARD SHAD	XIV	4	1	1	1
1983	JULY	GIZZARD SHAD	XIV	4	2	3	0
1983	JULY	GIZZARD SHAD	XIV	5	2	0	1
1983	JULY	GIZZARD SHAD	XV	1	1	11	7
1983	JULY	GIZZARD SHAD	XV	1	2	7	11
1983	JULY	GIZZARD SHAD	XV	2	1	11	0
1983	JULY	GIZZARD SHAD	XV	2	2	9	3
1983	JULY	GIZZARD SHAD	XV	3	1	2	5
1983	JULY	GIZZARD SHAD	XV	3	2	2	5
1983	JULY	GIZZARD SHAD	XV	4	1	12	0
1983	JULY	GIZZARD SHAD	XV	4	2	18	1
1983	JULY	GIZZARD SHAD	XV	5	1	0	1
1983	JULY	GIZZARD SHAD	XV	5	2	1	0
1983	AUGUST	GIZZARD SHAD	X	2	1	0	1
1983	AUGUST	GIZZARD SHAD	XIII	2	1	0	1
1983	AUGUST	GIZZARD SHAD	XIV	2	1	0	1
1983	AUGUST	GIZZARD SHAD	XIV	3	2	0	1
1983	AUGUST	GIZZARD SHAD	XIV	5	2	0	1
1984	JUNE	GIZZARD SHAD	X	1	1	1	7
1984	JUNE	GIZZARD SHAD	X	1	2	2	5
1984	JUNE	GIZZARD SHAD	X	2	1	1	2
1984	JUNE	GIZZARD SHAD	X	2	2	0	2
1984	JUNE	GIZZARD SHAD	X	3	1	0	3
1984	JUNE	GIZZARD SHAD	X	3	2	0	3
1984	JUNE	GIZZARD SHAD	X	4	1	2	2
1984	JUNE	GIZZARD SHAD	X	4	2	3	2
1984	JUNE	GIZZARD SHAD	XI	1	1	1	11
1984	JUNE	GIZZARD SHAD	XI	1	2	3	7
1984	JUNE	GIZZARD SHAD	XI	2	1	0	1

RIVER=DETROIT

YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1984	JUNE	GIZZARD SHAD	XI	2	2	0	1
1984	JUNE	GIZZARD SHAD	XI	3	1	6	1
1984	JUNE	GIZZARD SHAD	XI	3	2	9	0
1984	JUNE	GIZZARD SHAD	XII	1	1	7	6
1984	JUNE	GIZZARD SHAD	XII	1	2	6	9
1984	JUNE	GIZZARD SHAD	XIII	1	1	2	1
1984	JUNE	GIZZARD SHAD	XIII	1	2	1	8
1984	JUNE	GIZZARD SHAD	XIII	2	1	1	17
1984	JUNE	GIZZARD SHAD	XIII	2	2	0	20
1984	JUNE	GIZZARD SHAD	XIII	3	1	1	3
1984	JUNE	GIZZARD SHAD	XIII	3	2	2	0
1984	JUNE	GIZZARD SHAD	XIII	4	1	5	1
1984	JUNE	GIZZARD SHAD	XIII	4	2	3	3
1984	JUNE	GIZZARD SHAD	XIV	1	1	3	1
1984	JUNE	GIZZARD SHAD	XIV	1	2	2	0
1984	JUNE	GIZZARD SHAD	XIV	2	1	8	2
1984	JUNE	GIZZARD SHAD	XIV	2	2	6	0
1984	JUNE	GIZZARD SHAD	XIV	3	1	3	0
1984	JUNE	GIZZARD SHAD	XIV	3	2	5	4
1984	JUNE	GIZZARD SHAD	XIV	4	1	2	8
1984	JUNE	GIZZARD SHAD	XIV	4	2	3	3
1984	JUNE	GIZZARD SHAD	XIV	5	1	13	4
1984	JUNE	GIZZARD SHAD	XIV	5	2	38	11
1984	JUNE	GIZZARD SHAD	XV	1	1	5	1
1984	JUNE	GIZZARD SHAD	XV	1	2	6	5
1984	JUNE	GIZZARD SHAD	XV	2	1	5	3
1984	JUNE	GIZZARD SHAD	XV	3	1	35	24
1984	JUNE	GIZZARD SHAD	XV	3	2	42	21
1984	JUNE	GIZZARD SHAD	XV	4	1	93	0
1984	JUNE	GIZZARD SHAD	XV	4	1	9	3
1984	JUNE	GIZZARD SHAD	XV	4	2	48	0
1984	JUNE	GIZZARD SHAD	XV	5	1	5	7
1984	JUNE	GIZZARD SHAD	XV	5	2	6	8
1984	JULY	GIZZARD SHAD	X	2	2	0	1
1984	JULY	GIZZARD SHAD	XI	1	1	0	3
1984	JULY	GIZZARD SHAD	XI	1	2	0	2
1984	JULY	GIZZARD SHAD	XII	1	1	0	2
1984	JULY	GIZZARD SHAD	XII	1	2	0	3
1984	JULY	GIZZARD SHAD	XIII	1	1	0	4
1984	JULY	GIZZARD SHAD	XIII	1	2	0	1
1984	JULY	GIZZARD SHAD	XIII	4	1	0	2
1984	JULY	GIZZARD SHAD	XIV	5	2	0	1
1984	JULY	GIZZARD SHAD	XV	1	1	0	2
1984	JULY	GIZZARD SHAD	XV	2	1	0	1
1984	JULY	GIZZARD SHAD	XV	2	2	0	2
1984	JULY	GIZZARD SHAD	XV	3	1	0	1
1983	MAY	RAINBOW SMELT	XI	1	1	0	1
1983	MAY	RAINBOW SMELT	XII	1	2	0	1
1983	MAY	RAINBOW SMELT	XIII	2	2	1	0
1983	MAY	RAINBOW SMELT	XIV	1	1	4	0
1983	MAY	RAINBOW SMELT	XIV	1	2	5	0
1983	MAY	RAINBOW SMELT	XIV	2	2	3	0
1983	MAY	RAINBOW SMELT	XIV	3	1	7	1

RIVER=DETROIT

YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1983	MAY	RAINBOW SMELT	XV	1	2	1	0
1983	MAY	RAINBOW SMELT	XV	2	1	13	0
1983	MAY	RAINBOW SMELT	XV	2	2	9	0
1983	MAY	RAINBOW SMELT	XV	3	1	7	1
1983	MAY	RAINBOW SMELT	XV	3	2	9	0
1983	MAY	RAINBOW SMELT	XV	4	1	9	0
1983	MAY	RAINBOW SMELT	XV	4	2	4	0
1983	MAY	RAINBOW SMELT	XV	5	1	1	0
1983	MAY	RAINBOW SMELT	XV	5	2	3	0
1983	JUNE	RAINBOW SMELT	X	1	1	0	2
1983	JUNE	RAINBOW SMELT	X	2	1	0	1
1983	JUNE	RAINBOW SMELT	X	3	1	0	6
1983	JUNE	RAINBOW SMELT	X	3	2	0	4
1983	JUNE	RAINBOW SMELT	XI	1	1	1	1
1983	JUNE	RAINBOW SMELT	XI	1	2	0	1
1983	JUNE	RAINBOW SMELT	XI	2	1	0	1
1983	JUNE	RAINBOW SMELT	XI	2	2	0	1
1983	JUNE	RAINBOW SMELT	XI	3	1	0	1
1983	JUNE	RAINBOW SMELT	XI	3	2	0	1
1983	JUNE	RAINBOW SMELT	XII	1	1	0	5
1983	JUNE	RAINBOW SMELT	XII	1	2	0	4
1983	JUNE	RAINBOW SMELT	XIII	1	1	0	1
1983	JUNE	RAINBOW SMELT	XIII	2	1	0	1
1983	JUNE	RAINBOW SMELT	XIII	3	2	0	1
1983	JUNE	RAINBOW SMELT	XIII	3	2	0	2
1983	JUNE	RAINBOW SMELT	XIII	4	1	0	4
1983	JUNE	RAINBOW SMELT	XIII	4	2	0	3
1983	JUNE	RAINBOW SMELT	XIV	1	2	0	3
1983	JUNE	RAINBOW SMELT	XIV	2	2	0	2
1983	JUNE	RAINBOW SMELT	XIV	3	1	0	1
1983	JUNE	RAINBOW SMELT	XIV	4	1	0	3
1983	JUNE	RAINBOW SMELT	XIV	5	1	0	1
1983	JUNE	RAINBOW SMELT	XIV	5	2	0	1
1983	JUNE	RAINBOW SMELT	XV	1	1	3	2
1983	JUNE	RAINBOW SMELT	XV	1	2	0	2
1983	JUNE	RAINBOW SMELT	XV	4	2	0	3
1984	MAY	RAINBOW SMELT	XIII	2	1	1	0
1984	MAY	RAINBOW SMELT	XIII	3	1	1	0
1984	MAY	RAINBOW SMELT	XIII	3	3	0	1
1984	MAY	RAINBOW SMELT	XIV	3	2	1	0
1984	MAY	RAINBOW SMELT	XIV	4	1	1	0
1984	MAY	RAINBOW SMELT	XV	1	1	1	0
1984	JUNE	RAINBOW SMELT	X	1	1	0	1
1984	JUNE	RAINBOW SMELT	X	1	2	0	1
1984	JUNE	RAINBOW SMELT	X	2	2	0	1
1984	JUNE	RAINBOW SMELT	X	3	1	0	1
1984	JUNE	RAINBOW SMELT	X	3	2	0	2
1984	JUNE	RAINBOW SMELT	XI	1	1	0	4
1984	JUNE	RAINBOW SMELT	XI	1	2	0	1
1984	JUNE	RAINBOW SMELT	XI	2	1	0	5
1984	JUNE	RAINBOW SMELT	XI	2	2	0	1
1984	JUNE	RAINBOW SMELT	XI	3	1	0	3
1984	JUNE	RAINBOW SMELT	XI	3	2	0	1

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YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1984	JUNE	RAINBOW SMELT	XII	1	1	0	3
1984	JUNE	RAINBOW SMELT	XII	1	2	0	3
1984	JUNE	RAINBOW SMELT	XIII	1	1	1	1
1984	JUNE	RAINBOW SMELT	XIII	1	2	0	1
1984	JUNE	RAINBOW SMELT	XIII	2	2	0	1
1984	JUNE	RAINBOW SMELT	XIII	4	1	0	2
1984	JUNE	RAINBOW SMELT	XIV	1	1	0	1
1984	JUNE	RAINBOW SMELT	XIV	1	2	0	2
1984	JUNE	RAINBOW SMELT	XIV	4	1	0	2
1984	JUNE	RAINBOW SMELT	XIV	4	2	0	1
1984	JUNE	RAINBOW SMELT	XIV	5	2	0	1
1984	JUNE	RAINBOW SMELT	XV	2	2	0	3
1984	JUNE	RAINBOW SMELT	XV	4	2	0	2
1984	JULY	RAINBOW SMELT	X	1	1	0	2
1984	JULY	RAINBOW SMELT	XI	1	1	0	2
1984	JULY	RAINBOW SMELT	XI	1	2	0	2
1984	JULY	RAINBOW SMELT	XIII	1	2	0	1
1984	JULY	RAINBOW SMELT	XV	5	2	0	1
1983	MAY	BURBOT	XI	3	1	1	0
1983	JULY	BURBOT	X	3	1	0	1
1983	JULY	BURBOT	XIII	3	1	0	1
1983	JULY	BURBOT	XIV	2	2	1	0
1984	MAY	BURBOT	X	1	2	1	0
1984	MAY	BURBOT	X	2	2	1	0
1984	MAY	BURBOT	X	3	2	2	0
1984	MAY	BURBOT	XI	2	1	1	0
1984	MAY	BURBOT	XI	2	2	1	0
1984	MAY	BURBOT	XI	3	1	1	1
1984	MAY	BURBOT	XI	3	2	2	0
1984	MAY	BURBOT	XII	1	2	1	0
1984	MAY	BURBOT	XIII	1	1	1	0
1984	MAY	BURBOT	XIII	2	1	0	1
1984	MAY	BURBOT	XIV	1	1	1	0
1984	MAY	BURBOT	XIV	3	1	0	1
1984	MAY	BURBOT	XIV	3	2	1	0
1984	MAY	BURBOT	XV	1	1	1	0
1984	MAY	BURBOT	XV	4	1	1	0
1984	MAY	BURBOT	XV	5	2	1	0
1984	JUNE	BURBOT	XIII	3	2	1	0
1983	JUNE	TROUT PERCH	XI	3	1	1	0
1983	JUNE	TROUT PERCH	XIII	3	2	2	0
1983	JUNE	TROUT PERCH	XIII	4	2	1	0
1983	JUNE	TROUT PERCH	XIV	2	1	1	0
1983	JUNE	TROUT PERCH	XIV	3	1	1	0
1983	JUNE	TROUT PERCH	XIV	3	2	1	0
1983	JULY	TROUT PERCH	XIV	3	1	1	0
1984	JUNE	TROUT PERCH	X	3	2	2	0
1984	JUNE	TROUT PERCH	X	4	2	1	0
1984	JUNE	TROUT PERCH	XIII	2	2	1	0
1984	JUNE	TROUT PERCH	XIII	4	1	1	0
1984	JUNE	TROUT PERCH	XIV	5	2	1	0
1983	JUNE	WHITE PERCH	X	3	1	0	5
1983	JUNE	WHITE PERCH	X	3	2	2	0

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YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1983	JUNE	WHITE PERCH	XI	1	1	1	0
1983	JUNE	WHITE PERCH	XI	3	1	1	0
1983	JUNE	WHITE PERCH	XI	3	2	10	0
1983	JUNE	WHITE PERCH	XII	1	1	4	0
1983	JUNE	WHITE PERCH	XII	1	2	4	0
1983	JUNE	WHITE PERCH	XIII	1	1	5	0
1983	JUNE	WHITE PERCH	XIII	1	2	1	0
1983	JUNE	WHITE PERCH	XIII	3	2	2	0
1983	JUNE	WHITE PERCH	XIII	4	1	10	0
1983	JUNE	WHITE PERCH	XIII	4	2	6	0
1983	JUNE	WHITE PERCH	XIV	2	2	8	0
1983	JUNE	WHITE PERCH	XIV	3	1	17	0
1983	JUNE	WHITE PERCH	XIV	4	1	12	0
1983	JUNE	WHITE PERCH	XIV	4	2	1	0
1983	JUNE	WHITE PERCH	XIV	5	1	6	0
1983	JUNE	WHITE PERCH	XIV	5	2	3	0
1983	JUNE	WHITE PERCH	XV	1	2	52	0
1983	JUNE	WHITE PERCH	XV	2	1	7	0
1983	JUNE	WHITE PERCH	XV	2	2	13	0
1983	JUNE	WHITE PERCH	XV	3	1	4	0
1983	JUNE	WHITE PERCH	XV	4	1	13	0
1983	JUNE	WHITE PERCH	XV	4	2	17	0
1983	JUNE	WHITE PERCH	XV	5	1	1	0
1983	JUNE	WHITE PERCH	XV	5	2	3	0
1983	JULY	WHITE PERCH	XIV	2	1	1	0
1983	JULY	WHITE PERCH	XIV	2	2	1	0
1983	JULY	WHITE PERCH	XV	4	1	1	0
1983	JULY	WHITE PERCH	XV	4	2	1	0
1984	MAY	WHITE PERCH	XI	3	2	1	0
1984	JUNE	WHITE PERCH	X	1	2	2	2
1984	JUNE	WHITE PERCH	XI	1	1	1	2
1984	JUNE	WHITE PERCH	XI	1	2	1	0
1984	JUNE	WHITE PERCH	XI	3	1	8	0
1984	JUNE	WHITE PERCH	XII	1	2	5	1
1984	JUNE	WHITE PERCH	XIII	2	2	0	9
1984	JUNE	WHITE PERCH	XIII	4	2	12	0
1984	JUNE	WHITE PERCH	XIV	1	2	3	1
1984	JUNE	WHITE PERCH	XIV	2	1	6	1
1984	JUNE	WHITE PERCH	XIV	2	2	3	0
1984	JUNE	WHITE PERCH	XIV	3	2	15	0
1984	JUNE	WHITE PERCH	XIV	4	1	2	0
1984	JUNE	WHITE PERCH	XIV	4	2	1	0
1984	JUNE	WHITE PERCH	XIV	5	1	1	2
1984	JUNE	WHITE PERCH	XV	1	1	2	0
1984	JUNE	WHITE PERCH	XV	1	2	2	2
1984	JUNE	WHITE PERCH	XV	2	1	15	1
1984	JUNE	WHITE PERCH	XV	2	2	7	0
1984	JUNE	WHITE PERCH	XV	3	1	4	0
1984	JUNE	WHITE PERCH	XV	3	2	4	1
1984	JUNE	WHITE PERCH	XV	4	1	49	0
1984	JUNE	WHITE PERCH	XV	4	2	27	0
1984	JUNE	WHITE PERCH	XV	5	1	5	0
1984	JULY	WHITE PERCH	X	1	1	0	1

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YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1984	JULY	WHITE PERCH	X	1	2	0	1
1984	JULY	WHITE PERCH	X	2	2	0	1
1984	JULY	WHITE PERCH	X	3	2	1	2
1984	JULY	WHITE PERCH	XI	2	1	1	1
1984	JULY	WHITE PERCH	XI	3	2	0	1
1984	JULY	WHITE PERCH	XIII	1	2	0	1
1984	JULY	WHITE PERCH	XIV	2	2	0	1
1984	JULY	WHITE PERCH	XIV	3	1	0	1
1984	JULY	WHITE PERCH	XIV	5	2	0	1
1984	JULY	WHITE PERCH	XV	3	2	1	0
1983	JUNE	WHITE BASS	XV	1	2	12	0
1983	JULY	WHITE BASS	XI	1	1	0	1
1983	JULY	WHITE BASS	XII	1	2	0	1
1984	JUNE	WHITE BASS	X	1	1	2	1
1984	JUNE	WHITE BASS	X	2	1	2	0
1984	JUNE	WHITE BASS	X	3	1	0	4
1984	JUNE	WHITE BASS	X	3	2	0	3
1984	JUNE	WHITE BASS	X	4	1	0	4
1984	JUNE	WHITE BASS	X	4	2	1	2
1984	JUNE	WHITE BASS	XI	2	1	0	1
1984	JUNE	WHITE BASS	XI	2	2	2	2
1984	JUNE	WHITE BASS	XI	3	1	8	0
1984	JUNE	WHITE BASS	XI	3	2	10	5
1984	JUNE	WHITE BASS	XII	1	1	1	0
1984	JUNE	WHITE BASS	XIII	1	1	0	1
1984	JUNE	WHITE BASS	XIII	1	2	0	4
1984	JUNE	WHITE BASS	XIII	2	1	0	7
1984	JUNE	WHITE BASS	XIII	3	1	2	6
1984	JUNE	WHITE BASS	XIII	4	1	10	6
1984	JUNE	WHITE BASS	XIII	4	2	0	4
1984	JUNE	WHITE BASS	XIV	1	1	0	1
1984	JUNE	WHITE BASS	XIV	3	1	3	2
1984	JUNE	WHITE BASS	XIV	5	2	3	3
1984	JUNE	WHITE BASS	XV	2	2	0	2
1984	JUNE	WHITE BASS	XV	4	1	0	3
1984	JUNE	WHITE BASS	XV	4	2	0	2
1984	JUNE	WHITE BASS	XV	5	2	1	2
1984	JULY	WHITE BASS	X	1	1	0	1
1984	JULY	WHITE BASS	X	1	2	0	1
1984	JULY	WHITE BASS	X	4	1	0	2
1984	JULY	WHITE BASS	XI	1	2	0	2
1984	JULY	WHITE BASS	XI	3	1	0	1
1984	JULY	WHITE BASS	XIII	4	1	0	1
1984	JULY	WHITE BASS	XIII	4	2	0	1
1984	JULY	WHITE BASS	XIV	2	1	0	2
1984	JULY	WHITE BASS	XIV	2	2	0	1
1984	JULY	WHITE BASS	XIV	4	2	0	1
1984	JULY	WHITE BASS	XV	5	1	0	1
1983	JULY	FRESHWATER DRUM	XI	1	2	1	0
1984	JUNE	FRESHWATER DRUM	XI	3	2	1	0
1984	JUNE	FRESHWATER DRUM	XIII	4	2	0	2
1984	JUNE	FRESHWATER DRUM	XIV	3	1	1	0
1984	JUNE	FRESHWATER DRUM	XIV	5	2	7	1

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YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1984	JULY	FRESHWATER DRUM	X	1	1	1	0
1984	JULY	FRESHWATER DRUM	XI	1	2	1	0
1984	JULY	FRESHWATER DRUM	XIV	3	2	1	0
1984	JULY	FRESHWATER DRUM	XV	1	1	1	0
1984	JULY	FRESHWATER DRUM	XV	4	2	1	0
1983	APRIL	CISCO	XV	5	2	1	0
1983	MAY	CISCO	X	2	2	0	1
1983	APRIL	LAKE WHITEFISH	XII	1	1	0	1
1983	JULY	CARP	X	3	1	0	1
1983	JULY	CARP	XII	1	2	0	1
1983	JULY	CARP	XIV	1	1	0	1
1983	JULY	CARP	XIV	2	2	0	2
1983	JULY	CARP	XIV	4	1	1	0
1983	JULY	CARP	XV	1	2	0	1
1983	JULY	CARP	XV	3	2	0	1
1983	JULY	CARP	XV	4	1	0	1
1984	JUNE	CARP	X	1	2	0	1
1984	JUNE	CARP	X	4	1	1	0
1984	JUNE	CARP	XI	1	1	2	0
1984	JUNE	CARP	XI	1	2	2	0
1984	JUNE	CARP	XI	2	1	1	0
1984	JUNE	CARP	XII	1	1	2	0
1984	JUNE	CARP	XII	1	2	0	1
1984	JUNE	CARP	XIII	1	1	2	0
1984	JUNE	CARP	XIII	2	1	3	1
1984	JUNE	CARP	XIII	2	2	2	0
1984	JUNE	CARP	XIII	3	1	1	0
1984	JUNE	CARP	XIII	4	1	3	0
1984	JUNE	CARP	XIII	4	2	2	0
1984	JUNE	CARP	XIV	1	1	1	0
1984	JUNE	CARP	XIV	1	2	0	2
1984	JUNE	CARP	XIV	2	1	1	3
1984	JUNE	CARP	XIV	2	2	4	0
1984	JUNE	CARP	XIV	3	2	1	0
1984	JUNE	CARP	XIV	4	1	2	1
1984	JUNE	CARP	XIV	4	2	1	1
1984	JUNE	CARP	XV	1	1	3	14
1984	JUNE	CARP	XV	1	2	2	9
1984	JUNE	CARP	XV	2	1	0	2
1984	JUNE	CARP	XV	2	2	1	0
1984	JUNE	CARP	XV	3	2	3	1
1984	JUNE	CARP	XV	4	1	4	3
1984	JUNE	CARP	XV	4	2	5	0
1984	JUNE	CARP	XV	5	1	0	1
1984	JULY	CARP	XIV	1	2	2	0
1984	JULY	CARP	XIV	2	2	0	1
1984	JULY	CARP	XV	1	1	1	2
1984	JULY	CARP	XV	1	2	0	3
1984	JULY	CARP	XV	2	1	0	2
1984	JULY	CARP	XV	3	1	0	1
1983	JUNE	WHITE SUCKER	XIV	4	1	0	1
1983	JUNE	WHITE SUCKER	XV	3	1	0	1
1984	JULY	WHITE SUCKER	XIII	4	1	0	1

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YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1983	JUNE	SPOTTED SUCKER	XV	4	2	1	0
1983	JUNE	RIVER CARPSUCKER	XIV	3	1	1	0
1983	JULY	EMERALD SHINER	X	1	1	1	4
1983	JULY	EMERALD SHINER	X	1	2	0	5
1983	JULY	EMERALD SHINER	X	2	1	0	5
1983	JULY	EMERALD SHINER	X	2	2	2	6
1983	JULY	EMERALD SHINER	X	3	1	0	15
1983	JULY	EMERALD SHINER	X	3	2	0	8
1983	JULY	EMERALD SHINER	X	4	1	0	5
1983	JULY	EMERALD SHINER	X	4	1	0	1
1983	JULY	EMERALD SHINER	X	4	2	0	1
1983	JULY	EMERALD SHINER	XI	1	1	29	5
1983	JULY	EMERALD SHINER	XI	1	2	24	2
1983	JULY	EMERALD SHINER	XI	2	1	1	9
1983	JULY	EMERALD SHINER	XI	2	2	1	13
1983	JULY	EMERALD SHINER	XI	3	1	0	5
1983	JULY	EMERALD SHINER	XI	3	2	0	1
1983	JULY	EMERALD SHINER	XII	1	1	2	6
1983	JULY	EMERALD SHINER	XII	1	2	1	12
1983	JULY	EMERALD SHINER	XIII	1	1	3	3
1983	JULY	EMERALD SHINER	XIII	1	2	2	5
1983	JULY	EMERALD SHINER	XIII	2	1	1	8
1983	JULY	EMERALD SHINER	XIII	2	2	4	8
1983	JULY	EMERALD SHINER	XIII	3	1	0	4
1983	JULY	EMERALD SHINER	XIII	3	2	0	7
1983	JULY	EMERALD SHINER	XIII	4	1	0	9
1983	JULY	EMERALD SHINER	XIII	4	2	0	6
1983	JULY	EMERALD SHINER	XIV	1	1	0	11
1983	JULY	EMERALD SHINER	XIV	1	2	0	2
1983	JULY	EMERALD SHINER	XIV	2	1	3	4
1983	JULY	EMERALD SHINER	XIV	2	2	3	5
1983	JULY	EMERALD SHINER	XIV	3	1	1	3
1983	JULY	EMERALD SHINER	XIV	3	2	0	1
1983	JULY	EMERALD SHINER	XIV	4	1	2	0
1983	JULY	EMERALD SHINER	XIV	4	1	0	1
1983	JULY	EMERALD SHINER	XIV	5	1	0	6
1983	JULY	EMERALD SHINER	XIV	5	2	1	0
1983	JULY	EMERALD SHINER	XV	1	1	0	3
1983	JULY	EMERALD SHINER	XV	1	2	0	14
1983	JULY	EMERALD SHINER	XV	2	1	1	3
1983	JULY	EMERALD SHINER	XV	2	2	1	2
1983	JULY	EMERALD SHINER	XV	3	1	0	3
1983	JULY	EMERALD SHINER	XV	3	2	1	7
1983	JULY	EMERALD SHINER	XV	4	1	0	1
1983	JULY	EMERALD SHINER	XV	5	1	0	6
1983	JULY	EMERALD SHINER	XV	5	2	0	5
1983	AUGUST	EMERALD SHINER	X	1	1	0	1
1983	AUGUST	EMERALD SHINER	XI	1	1	0	1
1983	AUGUST	EMERALD SHINER	XI	1	2	0	2
1983	AUGUST	EMERALD SHINER	XI	2	2	0	1
1983	AUGUST	EMERALD SHINER	XI	3	1	0	1
1983	AUGUST	EMERALD SHINER	XIV	3	2	0	1
1983	AUGUST	EMERALD SHINER	XIV	5	1	0	1

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YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1983	AUGUST	EMERALD SHINER	XIV	5	2	0	1
1983	AUGUST	EMERALD SHINER	XV	3	2	0	1
1984	JUNE	EMERALD SHINER	X	1	1	0	2
1984	JUNE	EMERALD SHINER	X	1	2	3	0
1984	JUNE	EMERALD SHINER	X	2	1	0	4
1984	JUNE	EMERALD SHINER	X	2	2	0	2
1984	JUNE	EMERALD SHINER	X	2	2	0	6
1984	JUNE	EMERALD SHINER	X	3	2	0	4
1984	JUNE	EMERALD SHINER	XI	1	1	0	5
1984	JUNE	EMERALD SHINER	XI	1	2	6	1
1984	JUNE	EMERALD SHINER	XI	2	1	0	4
1984	JUNE	EMERALD SHINER	XI	2	2	0	5
1984	JUNE	EMERALD SHINER	XI	3	2	2	0
1984	JUNE	EMERALD SHINER	XII	1	1	4	1
1984	JUNE	EMERALD SHINER	XII	1	2	1	2
1984	JUNE	EMERALD SHINER	XIII	2	1	0	2
1984	JUNE	EMERALD SHINER	XIII	2	2	0	13
1984	JUNE	EMERALD SHINER	XIII	3	1	2	0
1984	JUNE	EMERALD SHINER	XIII	3	2	1	0
1984	JUNE	EMERALD SHINER	XIII	4	1	1	0
1984	JUNE	EMERALD SHINER	XIII	4	2	2	0
1984	JUNE	EMERALD SHINER	XIV	1	2	0	1
1984	JUNE	EMERALD SHINER	XIV	2	1	0	7
1984	JUNE	EMERALD SHINER	XIV	2	2	0	3
1984	JUNE	EMERALD SHINER	XIV	3	1	0	1
1984	JUNE	EMERALD SHINER	XIV	3	2	1	3
1984	JUNE	EMERALD SHINER	XV	1	1	0	2
1984	JUNE	EMERALD SHINER	XV	1	2	1	5
1984	JUNE	EMERALD SHINER	XV	2	1	0	2
1984	JUNE	EMERALD SHINER	XV	2	2	1	4
1984	JUNE	EMERALD SHINER	XV	3	2	1	0
1984	JUNE	EMERALD SHINER	XV	4	1	1	0
1984	JUNE	EMERALD SHINER	XV	4	2	1	0
1984	JUNE	EMERALD SHINER	XV	5	1	0	2
1984	JULY	EMERALD SHINER	X	1	1	0	14
1984	JULY	EMERALD SHINER	X	1	2	0	30
1984	JULY	EMERALD SHINER	X	2	1	0	10
1984	JULY	EMERALD SHINER	X	2	2	0	4
1984	JULY	EMERALD SHINER	X	3	1	0	4
1984	JULY	EMERALD SHINER	X	3	2	0	8
1984	JULY	EMERALD SHINER	X	4	1	0	4
1984	JULY	EMERALD SHINER	X	4	2	0	13
1984	JULY	EMERALD SHINER	XI	1	1	0	11
1984	JULY	EMERALD SHINER	XI	1	2	0	21
1984	JULY	EMERALD SHINER	XI	2	1	0	5
1984	JULY	EMERALD SHINER	XI	2	2	0	8
1984	JULY	EMERALD SHINER	XI	3	1	0	8
1984	JULY	EMERALD SHINER	XI	3	2	0	14
1984	JULY	EMERALD SHINER	XII	1	1	0	37
1984	JULY	EMERALD SHINER	XII	1	1	0	33
1984	JULY	EMERALD SHINER	XII	1	2	0	48
1984	JULY	EMERALD SHINER	XII	1	2	0	19
1984	JULY	EMERALD SHINER	XIII	1	1	0	13

RIVER=DETROIT

YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1984	JULY	EMERALD SHINER	XIII	1	2	0	1
1984	JULY	EMERALD SHINER	XIII	1	2	0	5
1984	JULY	EMERALD SHINER	XIII	2	1	1	4
1984	JULY	EMERALD SHINER	XIII	2	2	0	1
1984	JULY	EMERALD SHINER	XIII	2	2	0	35
1984	JULY	EMERALD SHINER	XIII	3	1	0	2
1984	JULY	EMERALD SHINER	XIII	3	2	0	5
1984	JULY	EMERALD SHINER	XIII	4	1	0	1
1984	JULY	EMERALD SHINER	XIII	4	1	0	11
1984	JULY	EMERALD SHINER	XIII	4	2	0	10
1984	JULY	EMERALD SHINER	XIV	1	1	0	6
1984	JULY	EMERALD SHINER	XIV	1	2	0	3
1984	JULY	EMERALD SHINER	XIV	2	1	0	5
1984	JULY	EMERALD SHINER	XIV	2	2	0	4
1984	JULY	EMERALD SHINER	XIV	3	2	0	5
1984	JULY	EMERALD SHINER	XIV	4	1	0	5
1984	JULY	EMERALD SHINER	XIV	4	2	0	2
1984	JULY	EMERALD SHINER	XIV	5	1	0	5
1984	JULY	EMERALD SHINER	XIV	5	2	0	1
1984	JULY	EMERALD SHINER	XV	1	1	0	5
1984	JULY	EMERALD SHINER	XV	1	2	0	5
1984	JULY	EMERALD SHINER	XV	2	1	0	4
1984	JULY	EMERALD SHINER	XV	2	2	0	1
1984	JULY	EMERALD SHINER	XV	3	1	0	1
1984	JULY	EMERALD SHINER	XV	3	2	0	2
1984	JULY	EMERALD SHINER	XV	4	1	0	1
1984	JULY	EMERALD SHINER	XV	5	1	0	4
1984	JULY	EMERALD SHINER	XV	5	2	0	2
1984	AUGUST	EMERALD SHINER	X	2	1	0	1
1984	AUGUST	EMERALD SHINER	X	2	2	0	1
1984	AUGUST	EMERALD SHINER	XI	2	1	1	0
1984	AUGUST	EMERALD SHINER	XI	2	2	1	0
1984	AUGUST	EMERALD SHINER	XIII	3	2	0	1
1984	AUGUST	EMERALD SHINER	XIV	1	2	0	1
1983	JUNE	SPOTTAIL SHINER	X	1	2	0	1
1983	JUNE	SPOTTAIL SHINER	XIII	4	1	1	0
1983	JUNE	SPOTTAIL SHINER	XIV	2	1	3	0
1983	JUNE	SPOTTAIL SHINER	XIV	2	2	3	0
1983	JUNE	SPOTTAIL SHINER	XIV	3	1	1	0
1983	JUNE	SPOTTAIL SHINER	XV	1	2	2	0
1983	JUNE	SPOTTAIL SHINER	XV	2	2	0	1
1983	JUNE	SPOTTAIL SHINER	XV	3	2	1	0
1983	JULY	SPOTTAIL SHINER	XII	1	2	0	1
1983	AUGUST	SPOTTAIL SHINER	XIII	1	2	0	1
1983	AUGUST	SPOTTAIL SHINER	XIV	1	2	1	1
1984	JUNE	SPOTTAIL SHINER	XII	1	2	1	0
1984	JUNE	SPOTTAIL SHINER	XIII	1	2	1	1
1984	JUNE	SPOTTAIL SHINER	XV	3	2	1	0
1984	JUNE	SPOTTAIL SHINER	XV	5	1	1	0
1984	JUNE	SPOTTAIL SHINER	XV	5	2	3	0
1984	JULY	SPOTTAIL SHINER	X	4	1	0	1
1983	JUNE	UNKNOWN MINNOW	XI	3	1	0	1
1983	JUNE	UNKNOWN MINNOW	XIII	4	2	1	0

RIVER=DETROIT

YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1983	JUNE	UNKNOWN MINNOW	XIV	4	1	1	0
1983	JUNE	UNKNOWN MINNOW	XIV	4	2	1	0
1983	JULY	UNKNOWN MINNOW	XIV	2	1	2	0
1983	JULY	UNKNOWN MINNOW	XIV	4	1	0	1
1984	JUNE	WHITE CRAPPIE	XV	2	1	0	2
1984	JUNE	WHITE CRAPPIE	XV	2	2	0	1
1984	JUNE	WHITE CRAPPIE	XV	3	1	0	10
1984	JUNE	WHITE CRAPPIE	XV	3	2	0	6
1984	JUNE	WHITE CRAPPIE	XV	5	1	0	1
1984	JULY	WHITE CRAPPIE	XIII	1	2	0	1
1984	JULY	WHITE CRAPPIE	XIV	5	2	0	1
1984	JULY	WHITE CRAPPIE	XV	1	1	0	1
1983	JULY	JOHNNY DARTER	X	1	1	0	1
1983	JULY	JOHNNY DARTER	XI	3	1	1	0
1983	JUNE	LOG PERCH	XIV	1	2	2	0
1983	JUNE	LOG PERCH	XIV	2	1	3	0
1983	JUNE	LOG PERCH	XIV	3	2	1	0
1983	JUNE	LOG PERCH	XV	1	1	4	0
1983	JUNE	LOG PERCH	XV	1	1	2	0
1983	JUNE	LOG PERCH	XV	3	2	1	0
1983	JULY	LOG PERCH	X	1	2	0	1
1983	JULY	LOG PERCH	XI	1	1	1	0
1983	JULY	LOG PERCH	XI	3	2	0	1
1983	JULY	LOG PERCH	XIII	2	2	1	1
1983	JULY	LOG PERCH	XIV	1	1	1	0
1983	JULY	LOG PERCH	XIV	2	2	0	1
1983	JULY	LOG PERCH	XIV	3	1	2	2
1983	JULY	LOG PERCH	XIV	3	2	1	1
1983	JULY	LOG PERCH	XV	3	1	3	0
1983	AUGUST	LOG PERCH	XIV	3	2	0	1
1983	AUGUST	LOG PERCH	XIV	4	1	0	1
1983	AUGUST	LOG PERCH	XV	4	1	0	1
1984	JUNE	LOG PERCH	X	1	1	0	1
1984	JUNE	LOG PERCH	X	2	1	0	1
1984	JUNE	LOG PERCH	XI	2	2	0	1
1984	JUNE	LOG PERCH	XII	1	1	1	2
1984	JUNE	LOG PERCH	XII	1	2	0	1
1984	JUNE	LOG PERCH	XIII	2	1	1	2
1984	JUNE	LOG PERCH	XIV	1	1	1	0
1984	JUNE	LOG PERCH	XIV	1	2	0	2
1984	JUNE	LOG PERCH	XV	1	2	0	1
1984	JUNE	LOG PERCH	XV	3	1	0	1
1984	JUNE	LOG PERCH	XV	3	2	1	1
1984	JULY	LOG PERCH	X	1	1	0	1
1984	JULY	LOG PERCH	X	2	1	0	2
1984	JULY	LOG PERCH	X	3	1	0	2
1984	JULY	LOG PERCH	X	3	2	0	2
1984	JULY	LOG PERCH	X	4	1	0	1
1984	JULY	LOG PERCH	XI	1	2	0	4
1984	JULY	LOG PERCH	XI	2	2	0	2
1984	JULY	LOG PERCH	XI	3	1	0	5
1984	JULY	LOG PERCH	XI	3	2	0	1
1984	JULY	LOG PERCH	XII	1	2	0	4

RIVER=DETROIT

YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1984	JULY	LOG PERCH	XIII	1	1	1	1
1984	JULY	LOG PERCH	XIII	1	2	0	2
1984	JULY	LOG PERCH	XIII	2	1	0	8
1984	JULY	LOG PERCH	XIII	2	2	0	9
1984	JULY	LOG PERCH	XIII	3	2	1	1
1984	JULY	LOG PERCH	XIII	4	2	1	0
1984	JULY	LOG PERCH	XIV	1	1	1	1
1984	JULY	LOG PERCH	XIV	1	2	0	1
1984	JULY	LOG PERCH	XIV	2	1	4	1
1984	JULY	LOG PERCH	XIV	2	2	1	2
1984	JULY	LOG PERCH	XIV	4	1	0	2
1984	JULY	LOG PERCH	XIV	5	1	0	1
1984	JULY	LOG PERCH	XIV	5	2	0	1
1984	JULY	LOG PERCH	XV	1	1	3	0
1984	JULY	LOG PERCH	XV	1	2	1	4
1984	JULY	LOG PERCH	XV	2	1	1	1
1984	JULY	LOG PERCH	XV	2	2	1	2
1984	JULY	LOG PERCH	XV	3	1	5	1
1984	JULY	LOG PERCH	XV	3	2	3	2
1984	JULY	LOG PERCH	XV	4	1	4	1
1984	JULY	LOG PERCH	XV	4	2	0	1
1984	JULY	LOG PERCH	XV	5	1	0	1
1984	JULY	LOG PERCH	XV	5	2	0	3
1983	MAY	UNKNOWN DARTER	X	1	1	0	1
1983	MAY	UNKNOWN DARTER	X	2	1	1	0
1983	MAY	UNKNOWN DARTER	XII	1	1	1	0
1983	MAY	UNKNOWN DARTER	XII	1	2	1	0
1983	MAY	UNKNOWN DARTER	XIV	2	1	1	0
1983	JUNE	UNKNOWN DARTER	XII	1	2	1	0
1983	JUNE	UNKNOWN DARTER	XIII	3	2	1	0
1983	JUNE	UNKNOWN DARTER	XIV	2	2	5	0
1983	JUNE	UNKNOWN DARTER	XIV	3	1	1	0
1983	JUNE	UNKNOWN DARTER	XIV	4	1	1	0
1983	JUNE	UNKNOWN DARTER	XIV	4	2	1	0
1983	JUNE	UNKNOWN DARTER	XV	1	2	1	0
1983	JUNE	UNKNOWN DARTER	XV	2	1	3	0
1983	JUNE	UNKNOWN DARTER	XV	2	2	3	0
1983	JULY	UNKNOWN DARTER	XIII	2	1	1	0
1983	JULY	UNKNOWN DARTER	XIV	2	1	6	0
1983	JULY	UNKNOWN DARTER	XIV	2	2	7	0
1983	JULY	UNKNOWN DARTER	XV	3	2	2	0
1983	JULY	UNKNOWN DARTER	XV	4	1	2	0
1983	AUGUST	UNKNOWN DARTER	XIII	4	1	1	0
1983	AUGUST	UNKNOWN DARTER	XIV	2	1	0	1
1983	AUGUST	UNKNOWN DARTER	XIV	2	2	2	0
1983	AUGUST	UNKNOWN DARTER	XIV	3	1	3	0
1983	AUGUST	UNKNOWN DARTER	XIV	3	2	2	0
1983	AUGUST	UNKNOWN DARTER	XV	4	2	1	0
1984	JUNE	UNKNOWN DARTER	XIII	3	1	1	0
1984	JUNE	UNKNOWN DARTER	XIII	4	1	1	0
1984	JUNE	UNKNOWN DARTER	XIII	4	2	1	0
1984	JUNE	UNKNOWN DARTER	XIV	5	2	2	0
1984	JULY	UNKNOWN DARTER	XIV	3	1	1	0

---------- RIVER=DETROIT ----------

YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1984	JULY	UNKNOWN DARTER	XV	4	1	1	0
1984	AUGUST	UNKNOWN DARTER	XII	1	2	1	0
1984	AUGUST	UNKNOWN DARTER	XIII	3	1	1	0
1984	AUGUST	UNKNOWN DARTER	XIV	1	2	1	0
1984	AUGUST	UNKNOWN DARTER	XIV	3	2	1	0
1984	AUGUST	UNKNOWN DARTER	XV	4	1	3	0
1984	AUGUST	UNKNOWN DARTER	XV	4	2	1	0
1983	MAY	YELLOW PERCH	X	1	2	1	0
1983	MAY	YELLOW PERCH	XI	1	1	1	0
1983	MAY	YELLOW PERCH	XII	1	1	3	0
1983	MAY	YELLOW PERCH	XIII	2	1	1	0
1983	MAY	YELLOW PERCH	XIV	5	2	1	0
1983	MAY	YELLOW PERCH	XV	2	1	1	0
1983	MAY	YELLOW PERCH	XV	2	2	1	0
1983	JUNE	YELLOW PERCH	X	3	2	0	1
1983	JUNE	YELLOW PERCH	XI	3	2	0	1
1983	JUNE	YELLOW PERCH	XIII	1	2	1	0
1984	MAY	YELLOW PERCH	X	1	2	3	0
1984	MAY	YELLOW PERCH	X	3	1	1	0
1984	MAY	YELLOW PERCH	X	4	1	1	0
1984	MAY	YELLOW PERCH	X	4	2	2	0
1984	MAY	YELLOW PERCH	XI	1	1	3	0
1984	MAY	YELLOW PERCH	XI	1	2	2	0
1984	MAY	YELLOW PERCH	XI	2	2	1	0
1984	MAY	YELLOW PERCH	XI	3	1	4	0
1984	MAY	YELLOW PERCH	XI	3	2	4	1
1984	MAY	YELLOW PERCH	XIII	1	1	1	1
1984	MAY	YELLOW PERCH	XIII	1	2	2	0
1984	MAY	YELLOW PERCH	XIII	2	2	0	1
1984	MAY	YELLOW PERCH	XIII	3	1	2	3
1984	MAY	YELLOW PERCH	XIII	3	2	2	0
1984	MAY	YELLOW PERCH	XIII	4	1	1	0
1984	MAY	YELLOW PERCH	XIII	4	2	3	3
1984	MAY	YELLOW PERCH	XIV	1	1	0	1
1984	MAY	YELLOW PERCH	XIV	2	2	0	3
1984	MAY	YELLOW PERCH	XIV	3	1	1	4
1984	MAY	YELLOW PERCH	XIV	3	2	0	3
1984	MAY	YELLOW PERCH	XIV	4	1	1	2
1984	MAY	YELLOW PERCH	XIV	4	2	1	0
1984	MAY	YELLOW PERCH	XIV	5	1	1	3
1984	MAY	YELLOW PERCH	XIV	5	2	2	2
1984	MAY	YELLOW PERCH	XV	1	1	1	0
1984	MAY	YELLOW PERCH	XV	4	1	1	0
1984	MAY	YELLOW PERCH	XV	5	1	4	3
1984	MAY	YELLOW PERCH	XV	5	2	2	2
1984	JUNE	YELLOW PERCH	X	1	1	0	1
1984	JUNE	YELLOW PERCH	XI	1	1	0	1
1984	JUNE	YELLOW PERCH	XI	1	2	0	1
1984	JUNE	YELLOW PERCH	XI	2	2	0	1
1984	JUNE	YELLOW PERCH	XV	2	2	0	1
1984	JUNE	YELLOW PERCH	XV	3	2	0	1
1983	MAY	WALLEYE	XI	3	2	1	0
1983	MAY	WALLEYE	XIII	2	1	1	0

---------- RIVER=DETROIT ----------

YEAR	MONTH	SPECIES	TRANSECT	STATION	TOW	YS	NYS
1983	MAY	WALLEYE	XIII	3	2	1	0
1983	JUNE	WALLEYE	XV	4	2	1	0
1984	MAY	WALLEYE	XI	2	2	1	0
1984	MAY	WALLEYE	XIII	2	1	1	0
1984	MAY	WALLEYE	XIII	3	1	3	0
1984	MAY	WALLEYE	XIV	2	2	1	0
1983	JUNE	SLIMY SCULPIN	XI	3	2	0	1
1983	APRIL	DEEPWATER SCULPIN	X	2	1	0	1
1983	APRIL	DEEPWATER SCULPIN	X	3	2	0	1
1983	APRIL	DEEPWATER SCULPIN	X	4	2	0	1
1983	APRIL	DEEPWATER SCULPIN	XI	2	1	0	1
1983	APRIL	DEEPWATER SCULPIN	XI	2	1	0	1
1983	MAY	DEEPWATER SCULPIN	X	2	2	0	1
1983	MAY	DEEPWATER SCULPIN	XII	1	1	1	0
1983	MAY	DEEPWATER SCULPIN	XIII	3	2	0	1
1983	MAY	DEEPWATER SCULPIN	XIV	1	2	0	1
1984	MAY	DEEPWATER SCULPIN	XIII	2	1	0	1
1983	MAY	UNKNOWN	XII	1	2	1	0
1983	JUNE	UNKNOWN	X	2	1	1	0
1983	JUNE	UNKNOWN	X	3	1	1	0
1983	JUNE	UNKNOWN	X	4	2	1	0
1983	JUNE	UNKNOWN	XIII	1	2	1	0
1983	JUNE	UNKNOWN	XIII	3	2	1	0
1983	JUNE	UNKNOWN	XIII	4	1	1	0
1983	JUNE	UNKNOWN	XIV	1	1	10	0
1983	JUNE	UNKNOWN	XIV	1	2	5	0
1983	JUNE	UNKNOWN	XIV	2	1	7	0
1983	JUNE	UNKNOWN	XIV	2	2	1	0
1983	JUNE	UNKNOWN	XIV	3	1	1	0
1983	JUNE	UNKNOWN	XIV	3	2	16	0
1983	JUNE	UNKNOWN	XIV	4	1	1	0
1983	JUNE	UNKNOWN	XV	1	1	75	0
1983	JUNE	UNKNOWN	XV	1	2	4	0
1983	JUNE	UNKNOWN	XV	3	2	3	0
1983	JULY	UNKNOWN	X	1	1	0	1
1983	JULY	UNKNOWN	XI	1	2	0	7
1983	JULY	UNKNOWN	XII	1	1	0	2
1983	JULY	UNKNOWN	XIII	1	1	0	1
1983	JULY	UNKNOWN	XIII	2	2	1	0
1983	JULY	UNKNOWN	XIV	3	1	1	0
1983	JULY	UNKNOWN	XIV	4	1	1	0
1984	MAY	UNKNOWN	XII	1	2	0	0
1984	JUNE	UNKNOWN	XI	1	2	0	1
1984	JUNE	UNKNOWN	XIII	1	1	0	1
1984	JUNE	UNKNOWN	XIII	3	2	2	4
1984	JUNE	UNKNOWN	XIV	5	1	1	0
1984	JUNE	UNKNOWN	XV	2	1	1	0
1984	JUNE	UNKNOWN	XV	4	2	0	1
1984	JULY	UNKNOWN	XI	2	2	0	1
1984	JULY	UNKNOWN	XII	1	2	0	1
1984	JULY	UNKNOWN	XIII	1	1	0	1
1984	JULY	UNKNOWN	XIV	1	2	0	1
1984	JULY	UNKNOWN	XIV	3	1	0	1

APPENDIX 7. Mean densities of fish in townet catches. Densities are means for catches from paired tows and are expressed as the number of fish per 1000 m^3 of water filtered, for selected species and for all taxa combined. Densities of yolk-sac larvae (YS), non-yolk-sac larvae (NYS), and juveniles (J) are listed separately.

TAXON=ALEWIFE YEAR=1983

MONTH	TRANSECT	STATION	YS	NYS	J
June	III	1	0.00	5.68	0.00
June	IV	1	0.00	34.67	0.00
June	V	1	0.00	16.68	0.00
June	IX	5	37.83	0.00	0.00
June	XI	1	0.00	9.75	0.00
June	XII	1	0.00	7.14	0.00
June	XIII	1	0.00	4.86	0.00
June	XIV	3	6.69	0.00	0.00
June	XIV	4	0.00	19.33	0.00
June	XIV	5	0.00	34.33	0.00
June	XV	1	0.00	11.20	0.00
June	XV	4	0.00	0.00	0.00
June	XV	5	62.52	0.00	0.00
July	I	1	35.60	0.00	0.00
July	I	2	47.79	0.00	0.00
July	I	3	0.00	11.67	0.00
July	II	1	175.05	131.35	0.00
July	III	1	122.35	5.69	0.00
July	III	2	95.20	6.03	0.00
July	III	3	57.06	22.31	0.00
July	IV	1	15.62	15.80	0.00
July	V	1	77.11	30.85	0.00
July	VI	1	35.85	0.00	0.00
July	VI	2	162.62	30.77	0.00
July	VI	3	126.29	0.00	0.00
July	VI	4	76.01	6.92	0.00
July	VI	5	300.62	78.28	0.00
July	VII	1	56.35	33.18	0.00
July	VII	2	100.47	11.16	0.00
July	VII	3	315.13	11.02	0.00
July	VII	4	153.25	17.97	0.00
July	VII	5	61.80	0.00	0.00
July	VIII	1	147.01	20.31	0.00
July	VIII	2	89.94	14.83	0.00
July	VIII	3	37.88	0.00	0.00
July	VIII	4	92.85	18.57	0.00
July	VIII	5	866.90	0.00	0.00
July	IX	1	584.45	0.00	0.00
July	IX	2	338.17	27.48	0.00
July	IX	3	168.44	4.90	0.00
July	IX	4	132.81	4.68	0.00
July	IX	5	135.05	0.00	0.00
July	X	1	55.34	254.95	0.00
July	X	2	11.18	46.75	0.00
July	X	3	0.00	115.08	0.00
July	X	4	0.00	62.05	0.00
July	XI	1	118.29	1027.85	0.00
July	XI	2	0.00	41.04	0.00
July	XI	3	0.00	88.27	0.00
July	XII	1	6.67	644.46	0.00
July	XIII	1	5.54	100.88	0.00
July	XIII	2	6.14	201.57	0.00
July	XIII	3	5.01	61.14	0.00
July	XIII	4	0.00	27.49	0.00

TAXON=ALEWIFE YEAR=1983

MONTH	TRANSECT	STATION	YS	NYS	J
July	XIV	1	16.32	341.89	0.00
July	XIV	2	8.30	346.23	0.00
July	XIV	3	6.04	279.67	0.00
July	XIV	4	26.06	183.18	0.00
July	XIV	5	0.00	665.22	0.00
July	XV	1	31.90	387.54	0.00
July	XV	2	16.15	195.98	0.00
July	XV	3	88.34	287.80	0.00
July	XV	4	0.00	132.44	0.00
July	XV	5	33.12	418.88	0.00
Aug	I	1	5.31	172.48	0.00
Aug	I	2	42.40	96.21	0.00
Aug	I	3	91.48	107.95	0.00
Aug	II	1	0.00	51.64	0.00
Aug	III	1	11.22	72.15	0.00
Aug	III	2	5.68	162.71	0.00
Aug	III	3	54.08	120.73	0.00
Aug	IV	1	0.00	18.67	0.00
Aug	V	1	0.00	66.03	14.87
Aug	VI	2	5.17	112.85	0.00
Aug	VI	3	0.00	112.97	0.00
Aug	VI	4	27.23	200.86	0.00
Aug	VI	5	0.00	110.18	0.00
Aug	VII	1	0.00	181.25	0.00
Aug	VII	2	0.00	133.31	0.00
Aug	VII	3	0.00	59.15	0.00
Aug	VII	4	5.60	106.12	0.00
Aug	VII	5	0.00	136.74	0.00
Aug	VIII	1	0.00	701.04	0.00
Aug	VIII	2	0.00	470.58	0.00
Aug	VIII	3	0.00	367.53	0.00
Aug	VIII	4	0.00	28.70	0.00
Aug	VIII	5	0.00	19.00	0.00
Aug	IX	2	0.00	15.73	0.00
Aug	IX	3	4.65	72.62	0.00
Aug	IX	4	0.00	349.54	0.00
Aug	IX	5	0.00	33.40	0.00
Aug	X	1	0.00	17.77	0.00
Aug	X	2	0.00	22.97	0.00
Aug	X	3	0.00	14.34	0.00
Aug	XI	1	0.00	17.67	44.16
Aug	XI	2	0.00	5.75	0.00
Aug	XI	3	0.00	6.40	0.00
Aug	XIII	2	0.00	5.31	0.00
Aug	XIV	2	0.00	17.42	0.00
Aug	XIV	3	0.00	11.32	0.00
Aug	XV	2	0.00	11.01	0.00
Aug	XV	3	0.00	45.35	0.00
Aug	XV	4	0.00	11.17	0.00
Aug	XV	5	0.00	130.46	0.00

TAXON=ALEWIFE YEAR=1984

MONTH	TRANSECT	STATION	YS	NYS	J
June	II	1	9.01	9.58	0.00
June	VII	4	0.00	12.80	0.00
June	X	1	22.44	128.43	0.00
June	X	2	12.29	61.47	0.00
Jure	X	3	0.00	56.12	0.00
June	X	4	0.00	92.72	0.00
June	XI	1	0.00	194.04	0.00
June	XI	2	0.00	48.74	0.00
June	XI	3	12.47	24.02	0.00
June	XII	1	7.10	80.52	0.00
June	XIII	1	0.00	16.29	0.00
June	XIII	2	0.00	128.31	0.00
June	XIII	3	0.00	56.75	0.00
June	XIII	4	22.83	0.00	0.00
June	XIV	1	0.00	16.92	0.00
June	XIV	2	0.00	84.74	0.00
June	XIV	3	0.00	37.37	0.00
June	XIV	4	9.41	47.03	0.00
June	XIV	5	0.00	288.65	0.00
June	XV	1	0.00	172.59	0.00
June	XV	2	0.00	51.82	0.00
June	XV	3	55.04	188.08	0.00
June	XV	4	0.00	58.25	0.00
June	XV	5	31.50	98.57	0.00
July	I	1	330.12	322.37	0.00
July	I	2	541.55	369.56	0.00
July	I	3	288.58	364.92	0.00
July	II	1	0.00	421.69	0.00
July	III	1	212.02	105.36	0.00
July	III	2	477.22	285.84	0.00
July	III	3	822.63	466.63	0.00
July	IV	1	178.29	329.23	0.00
July	V	1	66.72	361.20	0.00
July	VI	1	523.23	321.58	0.00
July	VI	2	233.02	259.73	0.00
July	VI	3	267.92	255.86	0.00
July	VI	4	443.14	707.74	0.00
July	VI	5	2223.76	4981.13	0.00
July	VII	1	81.25	370.35	0.00
July	VII	2	100.73	453.70	0.00
July	VII	3	145.61	301.15	0.00
July	VII	4	152.34	601.01	0.00
July	VII	5	123.84	712.65	0.00
July	VIII	1	73.54	163.01	0.00
July	VIII	2	55.76	408.26	0.00
July	VIII	3	74.65	456.27	0.00
July	VIII	4	122.41	340.21	0.00
July	VIII	5	105.79	808.45	0.00
July	IX	1	0.00	89.79	0.00
July	IX	2	60.39	351.97	0.00
July	IX	3	50.53	378.83	0.00
July	IX	4	34.35	398.67	0.00
July	IX	5	227.50	396.65	0.00
July	X	1	0.00	211.09	0.00

TAXON=ALEWIFE YEAR=1984

MONTH	TRANSECT	STATION	YS	NYS	J
July	X	2	0.00	265.05	0.00
July	X	3	0.00	36.38	0.00
July	X	4	0.00	65.94	0.00
July	XI	1	0.00	173.75	0.00
July	XI	2	0.00	345.86	0.00
July	XI	3	0.00	70.78	0.00
July	XII	1	0.00	395.06	13.26
July	XIII	1	0.00	65.16	0.00
July	XIII	2	0.00	516.83	0.00
July	XIII	3	0.00	10.64	0.00
July	XIII	4	0.00	51.55	0.00
July	XIV	1	0.00	429.44	0.00
July	XIV	2	0.00	290.88	0.00
July	XIV	3	0.00	13.32	0.00
July	XIV	4	0.00	48.44	0.00
July	XIV	5	0.00	346.66	0.00
July	XV	1	0.00	436.23	0.00
July	XV	2	0.00	293.14	0.00
July	XV	3	0.00	265.66	0.00
July	XV	4	0.00	120.85	0.00
July	XV	5	0.00	1254.62	385.51
Aug	I	1	0.00	28.77	0.00
Aug	I	3	0.00	60.68	0.00
Aug	III	1	0.00	13.05	0.00
Aug	III	2	0.00	17.06	0.00
Aug	III	3	0.00	7.66	0.00
Aug	V	1	0.00	31.61	0.00
Aug	VI	1	0.00	37.30	0.00
Aug	VI	3	0.00	8.74	0.00
Aug	VI	4	0.00	14.43	0.00
Aug	VII	2	0.00	5.54	0.00
Aug	VII	3	0.00	13.37	0.00
Aug	VII	4	0.00	5.75	0.00
Aug	VIII	1	0.00	15.99	0.00
Aug	VIII	3	0.00	4.17	0.00
Aug	IX	3	0.00	4.44	0.00
Aug	X	2	0.00	11.09	0.00
Aug	XIII	4	0.00	18.25	0.00
Aug	XV	2	0.00	12.00	0.00
Aug	XV	5	0.00	33.96	0.00

TAXON=GIZZARD SHAD YEAR=1983

MONTH	TRANSECT	STATION	YS	NYS	J
June	IV	1	0.00	76.10	0.00
June	V	1	35.42	324.11	0.00
June	XIII	4	0.00	17.79	0.00
June	XIV	5	256.30	16.78	0.00
June	XV	1	311.71	0.00	0.00
June	XV	4	0.00	0.00	0.00
July	II	1	10.93	43.81	0.00

TAXON=GIZZARD SHAD YEAR=1983

MONTH	TRANSECT	STATION	YS	NYS	J
July	III	2	0.00	5.87	0.00
July	X	1	0.00	210.45	0.00
July	X	4	0.00	83.86	0.00
July	XI	1	0.00	556.27	0.00
July	XII	1	0.00	576.79	0.00
July	XIII	1	0.00	78.83	0.00
July	XIII	2	0.00	67.09	0.00
July	XIII	3	10.02	0.00	0.00
July	XIII	4	0.00	19.76	0.00
July	XIV	1	114.05	97.39	0.00
July	XIV	2	101.17	58.74	0.00
July	XIV	3	24.47	24.47	0.00
July	XIV	4	34.70	8.79	0.00
July	XIV	5	0.00	18.17	0.00
July	XV	1	285.24	289.00	0.00
July	XV	2	326.00	48.45	0.00
July	XV	3	69.82	174.54	0.00
July	XV	4	327.00	10.69	0.00
July	XV	5	33.12	31.17	0.00
Aug	I	2	0.00	12.43	0.00
Aug	III	1	0.00	35.29	0.00
Aug	VII	3	0.00	6.24	0.00
Aug	IX	2	0.00	10.64	0.00
Aug	X	2	0.00	11.70	0.00
Aug	XIII	2	0.00	5.31	0.00
Aug	XIV	2	0.00	8.71	0.00
Aug	XIV	3	0.00	5.36	0.00
Aug	XIV	5	0.00	15.56	0.00

TAXON=GIZZARD SHAD YEAR=1984

MONTH	TRANSECT	STATION	YS	NYS	J
June	II	1	0.00	446.84	0.00
June	IV	1	0.00	17.95	0.00
June	V	1	0.00	1449.32	0.00
June	VIII	2	0.00	4.72	0.00
June	X	1	33.04	135.91	0.00
June	X	2	12.29	47.14	0.00
June	X	3	0.00	37.38	0.00
June	X	4	155.13	124.82	0.00
June	XI	1	36.73	167.40	0.00
June	XI	2	0.00	13.76	0.00
June	XI	3	90.76	5.77	0.00
June	XII	1	94.72	108.57	0.00
June	XIII	1	14.59	48.03	0.00
June	XIII	2	5.92	215.17	0.00
June	XIII	3	18.91	18.92	0.00
June	XIII	4	62.83	30.16	0.00
June	XIV	1	77.70	14.62	0.00
June	XIV	2	131.96	19.44	0.00
June	XIV	3	50.04	24.06	0.00

TAXON=GIZZARD SHAD YEAR=1984

MONTH	TRANSECT	STATION	YS	NYS	J
June	XIV	4	46.35	102.79	0.00
June	XIV	5	1138.64	334.48	0.00
June	XV	1	189.99	104.10	0.00
June	XV	2	90.02	54.01	0.00
June	XV	3	1433.25	833.15	0.00
June	XV	4	1771.03	35.96	0.00
June	XV	5	356.66	486.73	0.00
July	I	1	11.51	6.26	0.00
July	II	1	0.00	171.04	0.00
July	IV	1	0.00	32.62	0.00
July	X	2	0.00	11.49	0.00
July	XI	1	0.00	43.37	0.00
July	XII	1	0.00	35.38	0.00
July	XIII	1	0.00	23.16	0.00
July	XIII	4	0.00	18.54	0.00
July	XIV	5	0.00	17.51	0.00
July	XV	1	0.00	25.33	0.00
July	XV	2	0.00	36.91	0.00
July	XV	3	0.00	11.75	0.00
Aug	II	1	0.00	162.98	0.00

TAXON=RAINBOW SMELT YEAR=1983

MONTH	TRANSECT	STATION	YS	NYS	J
May	I	2	6.82	0.00	0.00
May	II	1	10.47	10.47	0.00
May	III	1	7.91	0.00	0.00
May	III	2	19.04	0.00	0.00
May	III	3	18.92	0.00	0.00
May	VI	1	6.48	0.00	0.00
May	VI	2	4.47	0.00	0.00
May	VI	3	77.16	10.67	0.00
May	VI	4	31.97	0.00	0.00
May	VII	1	36.27	36.27	0.00
May	VII	2	57.32	5.48	0.00
May	VII	3	102.01	11.67	0.00
May	VII	4	26.69	0.00	0.00
May	VII	5	70.21	0.00	0.00
May	VIII	1	70.40	18.70	0.00
May	VIII	2	161.56	0.00	0.00
May	VIII	3	144.30	0.00	0.00
May	VIII	4	471.92	19.15	0.00
May	VIII	5	148.07	34.51	0.00
May	IX	1	346.47	90.45	0.00
May	IX	2	171.14	0.00	0.00
May	IX	3	90.79	3.51	0.00
May	IX	4	134.61	0.00	0.00
May	XI	1	0.00	7.32	0.00
May	XII	1	0.00	7.26	0.00
May	XIII	2	4.29	0.00	0.00
May	XIV	1	141.23	0.00	0.00

TAXON=RAINBOW SMELT YEAR=1983

MONTH	TRANSECT	STATION	YS	NYS	J
May	XIV	2	48.56	0.00	0.00
May	XIV	3	35.91	5.13	0.00
May	XV	1	11.90	0.00	0.00
May	XV	2	267.46	0.00	0.00
May	XV	3	245.09	16.75	0.00
May	XV	4	212.18	0.00	0.00
May	XV	5	146.90	0.00	0.00
June	I	1	38.71	0.00	0.00
June	II	1	0.00	9.24	0.00
June	III	1	5.68	0.00	0.00
June	III	2	26.33	0.00	0.00
June	VI	3	0.00	11.26	0.00
June	VI	4	14.25	7.56	0.00
June	VII	3	6.31	0.00	0.00
June	VIII	2	4.99	0.00	0.00
June	VIII	3	4.37	0.00	0.00
June	VIII	4	0.00	4.25	0.00
June	IX	2	0.00	10.74	0.00
June	IX	3	4.61	0.00	0.00
June	X	1	0.00	14.75	0.00
June	X	2	0.00	12.28	0.00
June	X	3	0.00	60.38	0.00
June	XI	1	8.40	18.16	0.00
June	XI	2	0.00	14.72	0.00
June	XI	3	0.00	12.61	0.00
June	XII	1	0.00	62.86	0.00
June	XIII	1	0.00	4.86	0.00
June	XIII	2	0.00	5.33	0.00
June	XIII	3	0.00	17.63	0.00
June	XIII	4	0.00	124.91	0.00
June	XIV	1	0.00	52.17	0.00
June	XIV	2	0.00	16.51	0.00
June	XIV	3	0.00	6.42	0.00
June	XIV	4	0.00	21.02	0.00
June	XIV	5	0.00	34.33	0.00
June	XV	1	33.60	44.56	0.00
June	XV	4	0.00	0.00	0.00

TAXON=RAINBOW SMELT YEAR=1984

MONTH	TRANSECT	STATION	YS	NYS	J
May	XIII	2	5.30	0.00	0.00
May	XIII	3	5.23	0.00	0.00
May	XIV	3	5.64	0.00	0.00
May	XIV	4	8.47	0.00	0.00
May	XV	1	12.84	0.00	0.00
June	I	1	30.98	17.93	0.00
June	I	2	22.42	21.03	0.00
June	I	3	17.77	26.97	0.00
June	III	1	17.91	5.97	0.00
June	III	2	70.46	44.79	0.00

TAXON=RAINBOW SMELT YEAR=1984

MONTH	TRANSECT	STATION	YS	NYS	J
June	III	3	22.53	7.14	0.00
June	V	1	16.59	0.00	0.00
June	VI	1	0.00	67.52	0.00
June	VI	2	19.22	31.72	0.00
June	VI	3	37.45	0.00	0.00
June	VI	4	49.60	0.00	0.00
June	VI	5	36.42	17.41	0.00
June	VII	1	35.99	18.67	0.00
June	VII	2	24.09	29.86	0.00
June	VII	3	12.31	18.48	0.00
June	VII	4	18.58	18.58	0.00
June	VII	5	0.00	18.57	0.00
June	VIII	1	11.98	12.06	0.00
June	VIII	2	43.90	5.45	0.00
June	VIII	3	56.81	22.41	0.00
June	VIII	4	82.86	13.74	0.00
June	VIII	5	34.59	0.00	0.00
June	IX	1	32.19	0.00	0.00
June	IX	2	49.03	5.48	0.00
June	IX	3	25.15	30.95	0.00
June	IX	4	62.26	41.83	0.00
June	IX	5	31.72	0.00	0.00
June	X	1	0.00	22.44	0.00
June	X	2	0.00	11.27	0.00
June	X	3	0.00	18.71	0.00
June	XI	1	0.00	46.81	0.00
June	XI	2	0.00	38.95	0.00
June	XI	3	0.00	23.55	0.00
June	XII	1	0.00	43.64	0.00
June	XIII	1	4.58	10.01	0.00
June	XIII	2	0.00	5.73	0.00
June	XIII	4	0.00	16.33	0.00
June	XIV	1	0.00	48.46	0.00
June	XIV	4	0.00	27.99	0.00
June	XIV	5	0.00	22.92	0.00
June	XV	2	0.00	50.72	0.00
June	XV	4	0.00	22.85	0.00
July	I	3	0.00	8.48	0.00
July	V	1	0.00	18.04	18.04
July	VI	1	0.00	51.60	0.00
July	VI	2	0.00	15.63	0.00
July	VII	5	0.00	27.48	0.00
July	X	1	0.00	17.08	0.00
July	XI	1	0.00	34.80	0.00
July	XIII	1	0.00	4.66	4.66
July	XV	5	0.00	19.28	0.00

TAXON=EMERALD SHINER YEAR=1983

MONTH	TRANSECT	STATION	YS	NYS	J
June	V	1	17.71	0.00	0.00
July	II	1	21.86	0.00	0.00
July	VII	3	16.62	0.00	0.00
July	IX	2	5.46	0.00	0.00
July	IX	3	5.18	0.00	0.00
July	X	1	11.11	99.63	0.00
July	X	2	22.35	128.05	0.00
July	X	3	0.00	132.52	0.00
July	X	4	0.00	198.74	0.00
July	XI	1	446.53	58.92	0.00
July	XI	2	11.81	130.98	0.00
July	XI	3	0.00	35.11	0.00
July	XII	1	19.55	114.40	0.00
July	XIII	1	28.05	44.67	0.00
July	XIII	2	30.63	97.64	0.00
July	XIII	3	0.00	62.14	0.00
July	XIII	4	0.00	100.53	0.00
July	XIV	1	0.00	211.18	0.00
July	XIV	2	50.73	75.95	0.00
July	XIV	3	6.04	24.24	0.00
July	XIV	4	17.57	8.79	0.00
July	XIV	5	18.17	107.08	0.00
July	XV	1	0.00	276.35	0.00
July	XV	2	32.57	81.57	0.00
July	XV	3	16.39	170.28	0.00
July	XV	4	0.00	11.21	0.00
July	XV	5	0.00	352.64	0.00
Aug	V	1	0.00	18.14	0.00
Aug	VI	1	0.00	42.09	0.00
Aug	VI	2	0.00	5.65	0.00
Aug	VI	5	59.71	0.00	0.00
Aug	VII	5	0.00	34.18	0.00
Aug	VIII	1	0.00	6.69	0.00
Aug	VIII	2	0.00	13.63	0.00
Aug	VIII	3	0.00	7.59	0.00
Aug	IX	1	0.00	33.68	0.00
Aug	IX	4	0.00	15.44	0.00
Aug	X	1	0.00	8.79	0.00
Aug	XI	1	0.00	26.14	0.00
Aug	XI	2	0.00	5.75	0.00
Aug	XI	3	0.00	6.40	0.00
Aug	XIV	3	0.00	5.36	0.00
Aug	XIV	5	0.00	31.86	0.00
Aug	XV	3	0.00	15.61	0.00

TAXON=EMERALD SHINER YEAR=1984

MONTH	TRANSECT	STATION	YS	NYS	J
June	II	1	425.37	1351.47	0.00
June	IV	1	0.00	36.13	0.00
June	V	1	0.00	155.15	0.00
June	VIII	4	0.00	6.66	0.00
June	IX	1	0.00	15.82	0.00
June	X	1	31.79	23.69	0.00
June	X	2	0.00	139.37	0.00
June	X	3	0.00	24.98	0.00
June	XI	1	54.60	56.24	0.00
June	XI	2	0.00	62.50	0.00
June	XI	3	12.47	0.00	0.00
June	XII	1	36.88	21.64	0.00
June	XIII	2	0.00	86.29	0.00
June	XIII	3	18.92	0.00	0.00
June	XIII	4	22.83	0.00	0.00
June	XIV	1	0.00	16.92	0.00
June	XIV	2	0.00	95.14	0.00
June	XIV	3	6.02	24.70	0.00
June	XV	1	17.40	121.22	0.00
June	XV	2	16.91	103.64	0.00
June	XV	3	19.19	0.00	0.00
June	XV	4	23.41	0.00	0.00
June	XV	5	0.00	67.07	0.00
July	I	3	0.00	8.48	0.00
July	II	1	0.00	102.63	0.00
July	IV	1	0.00	16.69	0.00
July	V	1	0.00	18.04	0.00
July	VI	1	0.00	17.20	0.00
July	VI	5	0.00	17.14	0.00
July	IX	3	5.44	0.00	0.00
July	IX	5	18.75	0.00	0.00
July	X	1	0.00	361.04	0.00
July	X	2	0.00	170.30	0.00
July	X	3	0.00	74.00	57.34
July	X	4	0.00	309.82	15.64
July	XI	1	0.00	279.75	0.00
July	XI	2	0.00	77.22	0.00
July	XI	3	0.00	130.69	0.00
July	XII	1	0.00	958.20	6.63
July	XIII	1	0.00	88.09	0.00
July	XIII	2	5.34	203.84	0.00
July	XIII	3	0.00	36.03	0.00
July	XIII	4	0.00	195.77	18.54
July	XIV	1	0.00	144.20	15.72
July	XIV	2	0.00	82.29	0.00
July	XIV	3	0.00	30.16	0.00
July	XIV	4	0.00	54.75	0.00
July	XIV	5	0.00	113.81	0.00
July	XV	1	0.00	123.93	0.00
July	XV	2	0.00	60.28	0.00
July	XV	3	0.00	34.42	0.00
July	XV	4	0.00	11.48	0.00
July	XV	5	0.00	115.81	0.00
Aug	I	2	0.00	5.57	0.00

TAXON=EMERALD SHINER YEAR=1984

MONTH	TRANSECT	STATION	YS	NYS	J
Aug	I	3	0.00	43.53	0.00
Aug	II	1	0.00	16.43	8.43
Aug	IV	1	0.00	67.89	0.00
Aug	V	1	0.00	225.58	0.00
Aug	VI	1	0.00	0.00	0.00
Aug	VI	2	0.00	22.60	13.33
Aug	VI	3	0.00	26.62	0.00
Aug	VI	5	0.00	33.23	282.49
Aug	VII	3	0.00	5.96	0.00
Aug	VII	4	0.00	5.75	0.00
Aug	VII	5	0.00	17.03	0.00
Aug	VIII	5	0.00	49.48	0.00
Aug	IX	2	0.00	6.26	0.00
Aug	IX	3	0.00	13.33	0.00
Aug	X	2	0.00	22.79	0.00
Aug.	XI	2	11.73	0.00	0.00
Aug	XIII	3	0.00	5.34	0.00
Aug	XIV	1	0.00	16.67	0.00

TAXON=SPOTTAIL SHINER YEAR=1983

MONTH	TRANSECT	STATION	YS	NYS	J
June	X	1	0.00	10.06	0.00
June	XIII	4	17.89	0.00	0.00
June	XIV	2	54.21	0.00	0.00
June	XIV	3	6.42	0.00	0.00
June	XV	1	22.17	0.00	0.00
June	XV	2	0.00	19.25	0.00
June	XV	3	18.56	0.00	0.00
July	XII	1	0.00	6.20	0.00
Aug	I	1	5.50	0.00	0.00
Aug	II	1	0.00	8.74	0.00
Aug	VI	2	5.65	5.17	0.00
Aug	VII	2	5.54	0.00	0.00
Aug	VII	4	0.00	5.60	0.00
Aug	VIII	1	0.00	13.36	0.00
Aug	VIII	5	19.00	22.25	0.00
Aug	IX	2	5.32	0.00	0.00
Aug	IX	4	0.00	5.27	0.00
Aug	XIII	1	0.00	4.76	0.00
Aug	XIV	1	33.88	33.88	0.00

TAXON=SPOTTAIL SHINER YEAR=1984

MONTH	TRANSECT	STATION	YS	NYS	J
June	III	1	5.97	0.00	0.00
June	VI	5	17.41	0.00	0.00
June	XII	1	7.10	0.00	0.00
June	XIII	1	5.43	5.43	0.00
June	XV	3	19.19	0.00	0.00
June	XV	5	128.03	0.00	0.00
July	III	2	5.84	0.00	0.00
July	VI	4	0.00	6.74	0.00
July	VI	5	53.48	177.58	0.00
July	IX	3	5.44	0.00	0.00
July	X	4	0.00	15.64	0.00

TAXON=LOG PERCH YEAR=1983

MONTH	TRANSECT	STATION	YS	NYS	J
June	I	1	5.56	0.00	0.00
June	I	2	21.44	0.00	0.00
June	II	1	9.78	0.00	0.00
June	III	2	118.71	0.00	0.00
June	III	3	7.39	0.00	0.00
June	VI	3	34.58	0.00	0.00
June	IX	3	13.47	0.00	0.00
June	XIV	1	34.78	0.00	0.00
June	XIV	2	29.44	0.00	0.00
June	XIV	3	6.69	0.00	0.00
June	XV	1	67.19	0.00	0.00
June	XV	3	18.56	0.00	0.00
July	III	2	6.03	0.00	0.00
July	VI	2	30.29	0.00	0.00
July	VI	3	10.91	0.00	0.00
July	VII	2	11.00	0.00	0.00
July	VIII	1	6.54	0.00	0.00
July	VIII	4	4.92	0.00	0.00
July	IX	2	11.24	0.00	0.00
July	IX	3	5.18	0.00	0.00
July	IX	5	41.71	0.00	0.00
July	X	1	0.00	11.04	0.00
July	XI	1	8.40	0.00	0.00
July	XI	3	0.00	5.93	0.00
July	XIII	2	6.14	6.14	0.00
July	XIV	1	16.23	0.00	0.00
July	XIV	2	0.00	8.30	0.00
July	XIV	3	18.20	18.20	0.00
July	XV	3	55.56	0.00	0.00
Aug	XIV	3	0.00	5.36	0.00
Aug	XIV	4	0.00	6.96	0.00
Aug	XV	4	0.00	11.64	0.00

TAXON=LOG PERCH YEAR=1984

MONTH	TRANSECT	STATION	YS	NYS	J
June	I	1	25.00	0.00	0.00
June	I	2	53.78	0.00	0.00
June	II	1	0.00	9.01	0.00
June	III	1	6.26	0.00	0.00
June	III	2	178.83	0.00	0.00
June	III	3	144.53	0.00	0.00
June	VI	1	52.37	0.00	0.00
June	VI	2	123.00	0.00	0.00
June	VI	3	122.31	0.00	0.00
June	VI	4	221.33	0.00	0.00
June	VI	5	34.83	0.00	0.00
June	VII	2	495.41	0.00	0.00
June	VII	3	104.90	6.17	0.00
June	VII	4	194.08	0.00	0.00
June	VIII	1	24.03	0.00	0.00
June	VIII	2	156.07	0.00	0.00
June	VIII	3	113.13	0.00	0.00
June	VIII	4	307.67	19.97	0.00
June	VIII	5	62.05	0.00	0.00
June	IX	1	189.88	0.00	0.00
June	IX	2	48.78	0.00	0.00
June	IX	3	146.50	0.00	0.00
June	IX	4	198.21	0.00	0.00
June	X	1	0.00	11.85	0.00
June	X	2	0.00	12.29	0.00
June	XI	2	0.00	7.46	0.00
June	XII	1	7.45	21.99	0.00
June	XIII	2	5.92	11.84	0.00
June	XIV	1	14.62	33.84	0.00
June	XV	1	0.00	17.40	0.00
June	XV	3	19.19	37.11	0.00
July	I	3	8.48	0.00	0.00
July	III	2	23.35	0.00	0.00
July	III	3	24.59	0.00	0.00
July	V	1	52.77	33.36	0.00
July	VI	1	189.20	0.00	0.00
July	VI	2	124.44	10.50	0.00
July	VI	3	19.59	0.00	0.00
July	VI	4	6.74	0.00	0.00
July	VII	2	5.15	0.00	0.00
July	VII	3	40.05	0.00	0.00
July	VII	4	18.52	0.00	0.00
July	VII	4	21.98	0.00	0.00
July	VIII	5	35.15	0.00	0.00
July	IX	2	6.22	0.00	0.00
July	IX	4	16.78	0.00	0.00
July	X	1	0.00	8.54	0.00
July	X	2	0.00	24.87	0.00
July	X	3	0.00	24.87	0.00
July	X	4	0.00	15.64	0.00
July	XI	1	0.00	35.33	0.00
July	XI	2	0.00	11.73	0.00
July	XI	3	0.00	35.10	0.00
July	XII	1	0.00	29.49	0.00

TAXON=LOG PERCH YEAR=1984

MONTH	TRANSECT	STATION	YS	NYS	J
July	XIII	1	4.63	13.94	0.00
July	XIII	2	0.00	88.32	0.00
July	XIII	3	5.08	5.08	0.00
July	XIII	4	8.46	0.00	0.00
July	XIV	1	16.17	31.89	0.00
July	XIV	2	46.47	27.02	0.00
July	XIV	4	0.00	15.26	0.00
July	XIV	5	0.00	36.77	0.00
July	XV	1	50.12	48.48	0.00
July	XV	2	24.43	36.91	0.00
July	XV	3	92.75	34.42	0.00
July	XV	4	45.90	24.47	0.00
July	XV	5	0.00	77.14	0.00

TAXON=YELLOW PERCH YEAR=1983

MONTH	TRANSECT	STATION	YS	NYS	J
May	IV	1	15.57	0.00	0.00
May	X	1	8.44	0.00	0.00
May	XI	1	7.32	0.00	0.00
May	XII	1	24.65	0.00	0.00
May	XIII	2	5.37	0.00	0.00
May	XIV	5	17.22	0.00	0.00
May	XV	2	24.37	0.00	0.00
June	X	3	0.00	5.79	0.00
June	XI	3	0.00	5.65	0.00
June	XIII	1	5.45	0.00	0.00
Aug	VII	3	5.88	0.00	0.00

TAXON=YELLOW PERCH YEAR=1984

MONTH	TRANSECT	STATION	YS	NYS	J
May	II	1	0.00	0.00	0.00
May	IV	1	33.92	0.00	0.00
May	V	1	148.52	0.00	0.00
May	X	1	27.27	0.00	0.00
May	X	3	6.72	0.00	0.00
May	X	4	61.55	0.00	0.00
May	XI	1	49.53	0.00	0.00
May	XI	2	6.61	0.00	0.00
May	XI	3	47.44	5.65	0.00
May	XIII	1	16.97	5.66	0.00
May	XIII	2	0.00	4.86	0.00
May	XIII	3	21.13	15.69	0.00
May	XIII	4	38.90	27.99	0.00
May	XIV	1	0.00	17.77	0.00
May	XIV	2	0.00	21.54	0.00
May	XIV	3	6.17	41.58	0.00
May	XIV	4	18.79	16.94	0.00

TAXON=YELLOW PERCH YEAR=1984

MONTH	TRANSECT	STATION	YS	NYS	J
May	XIV	5	53.92	90.64	0.00
May	XV	1	12.84	0.00	0.00
May	XV	4	11.49	0.00	0.00
May	XV	5	105.44	88.06	0.00
June	I	1	5.98	11.95	0.00
June	I	2	7.94	0.00	0.00
June	III	1	5.97	0.00	0.00
June	III	2	0.00	6.42	0.00
June	VI	2	20.17	0.00	0.00
June	VI	3	9.24	0.00	0.00
June	VII	3	0.00	6.14	0.00
June	VIII	3	16.96	0.00	0.00
June	IX	2	5.48	0.00	0.00
June	IX	3	0.00	8.38	0.00
June	IX	4	0.00	5.11	0.00
June	X	1	0.00	11.85	0.00
June	XI	1	0.00	18.53	0.00
June	XI	2	0.00	7.46	0.00
June	XV	2	0.00	16.91	0.00
June	XV	3	0.00	19.19	0.00
July	VI	2	0.00	5.25	0.00
July	VIII	3	0.00	4.40	0.00
July	VIII	5	0.00	17.52	0.00

TAXON=WALLEYE YEAR=1983

MONTH	TRANSECT	STATION	YS	NYS	J
May	XI	3	5.23	0.00	0.00
May	XIII	2	5.37	0.00	0.00
May	XIII	3	4.92	0.00	0.00
June	XV	4	0.00	0.00	0.00

TAXON=WALLEYE YEAR=1984

MONTH	TRANSECT	STATION	YS	NYS	J
May	XI	2	6.61	0.00	0.00
May	XIII	2	5.30	0.00	0.00
May	XIII	3	15.69	0.00	0.00
May	XIV	2	7.18	0.00	0.00

TAXON=ALL YEAR=1983

MONTH	TRANSECT	STATION	YS	NYS	J
April	I	1	0.00	7.18	0.00
April	I	2	0.00	6.52	0.00
April	I	3	0.00	0.00	0.00
April	II	1	0.00	0.00	0.00
April	III	1	0.00	7.55	0.00
April	III	2	0.00	6.78	0.00
April	III	3	0.00	0.00	0.00
April	IV	1	0.00	0.00	0.00
April	V	1	0.00	0.00	0.00
April	VI	1	0.00	27.00	0.00
April	VI	2	0.00	5.69	0.00
April	VI	3	0.00	0.00	0.00
April	VI	4	0.00	0.00	0.00
April	VI	5	0.00	0.00	0.00
April	VII	1	0.00	0.00	0.00
April	VII	2	0.00	15.02	0.00
April	VII	3	0.00	0.00	0.00
April	VII	4	0.00	0.00	0.00
April	VII	5	0.00	0.00	0.00
April	VIII	1	0.00	0.00	0.00
April	VIII	2	0.00	6.32	0.00
April	VIII	3	0.00	0.00	0.00
April	VIII	4	0.00	0.00	0.00
April	VIII	5	0.00	0.00	0.00
April	IX	1	0.00	0.00	0.00
April	IX	2	0.00	0.00	0.00
April	IX	3	0.00	5.17	0.00
April	IX	4	0.00	0.00	0.00
April	IX	5	0.00	0.00	0.00
April	X	1	0.00	0.00	0.00
April	X	2	0.00	8.24	0.00
April	X	3	0.00	6.91	0.00
April	X	4	0.00	15.35	0.00
April	XI	1	0.00	0.00	0.00
April	XI	2	0.00	12.80	0.00
April	XI	3	0.00	0.00	0.00
April	XII	1	0.00	7.09	0.00
April	XIII	1	0.00	0.00	0.00
April	XIII	2	0.00	0.00	0.00
April	XIII	3	0.00	0.00	0.00
April	XIII	4	0.00	0.00	0.00
April	XIV	1	0.00	0.00	0.00
April	XIV	2	0.00	0.00	0.00
April	XIV	3	0.00	0.00	0.00
April	XIV	4	0.00	0.00	0.00
April	XIV	5	0.00	0.00	0.00
April	XV	1	0.00	0.00	0.00
April	XV	2	0.00	0.00	0.00
April	XV	3	0.00	0.00	0.00
April	XV	4	0.00	0.00	0.00
April	XV	5	30.25	0.00	0.00
May	I	1	0.00	0.00	0.00
May	I	2	6.82	0.00	0.00
May	I	3	0.00	0.00	0.00

TAXON=ALL YEAR=1983

MONTH	TRANSECT	STATION	YS	NYS	J
May	II	1	10.47	10.47	0.00
May	III	1	15.82	0.00	0.00
May	III	2	23.80	0.00	0.00
May	III	3	18.92	0.00	0.00
May	IV	1	15.57	0.00	0.00
May	V	1	18.25	0.00	0.00
May	VI	1	6.48	6.78	0.00
May	VI	2	4.47	0.00	0.00
May	VI	3	77.16	20.52	0.00
May	VI	4	31.97	0.00	0.00
May	VI	5	0.00	0.00	0.00
May	VII	1	36.27	36.27	0.00
May	VII	2	63.30	5.48	0.00
May	VII	3	102.01	11.67	0.00
May	VII	4	26.69	0.00	0.00
May	VII	5	70.21	0.00	0.00
May	VIII	1	89.10	18.70	0.00
May	VIII	2	174.57	0.00	0.00
May	VIII	3	153.29	8.99	0.00
May	VIII	4	511.30	19.15	0.00
May	VIII	5	182.58	69.01	0.00
May	IX	1	346.47	90.45	0.00
May	IX	2	171.14	0.00	0.00
May	IX	3	94.30	3.51	0.00
May	IX	4	143.66	0.00	0.00
May	IX	5	0.00	0.00	0.00
May	X	1	8.44	8.96	0.00
May	X	2	6.43	12.60	0.00
May	X	3	0.00	0.00	0.00
May	X	4	0.00	0.00	0.00
May	XI	1	7.32	7.32	0.00
May	XI	2	0.00	0.00	0.00
May	XI	3	10.71	0.00	0.00
May	XII	1	55.61	7.26	0.00
May	XIII	1	0.00	0.00	0.00
May	XIII	2	15.03	0.00	0.00
May	XIII	3	4.92	4.92	0.00
May	XIII	4	0.00	0.00	0.00
May	XIV	1	141.23	16.02	0.00
May	XIV	2	64.26	0.00	0.00
May	XIV	3	35.91	5.13	0.00
May	XIV	4	0.00	0.00	0.00
May	XIV	5	17.22	0.00	0.00
May	XV	1	11.90	0.00	0.00
May	XV	2	291.83	0.00	0.00
May	XV	3	245.09	16.75	0.00
May	XV	4	212.18	0.00	0.00
May	XV	5	146.90	0.00	0.00
June	I	1	49.73	0.00	0.00
June	I	2	21.44	0.00	0.00
June	I	3	8.70	0.00	0.00
June	II	1	58.14	9.24	0.00
June	III	1	11.36	5.68	0.00

TAXON=ALL YEAR=1983

MONTH	TRANSECT	STATION	YS	NYS	J
June	III	2	145.05	0.00	0.00
June	III	3	7.39	0.00	0.00
June	IV	1	14.69	110.77	0.00
June	V	1	53.13	340.79	0.00
June	VI	1	0.00	0.00	0.00
June	VI	2	7.41	0.00	0.00
June	VI	3	67.57	11.26	0.00
June	VI	4	194.87	7.56	0.00
June	VI	5	0.00	0.00	0.00
June	VII	1	0.00	0.00	0.00
June	VII	2	94.97	0.00	0.00
June	VII	3	286.59	0.00	0.00
June	VII	4	42.55	0.00	0.00
June	VII	5	0.00	0.00	0.00
June	VIII	1	17.37	0.00	0.00
June	VIII	2	51.53	4.99	0.00
June	VIII	3	30.81	8.75	0.00
June	VIII	4	55.14	4.25	0.00
June	VIII	5	0.00	0.00	0.00
June	IX	1	0.00	0.00	0.00
June	IX	2	222.39	10.74	0.00
June	IX	3	77.82	0.00	0.00
June	IX	4	42.60	0.00	0.00
June	IX	5	37.83	0.00	0.00
June	X	1	0.00	24.81	0.00
June	X	2	12.28	12.28	0.00
June	X	3	17.78	97.18	0.00
June	X	4	33.87	0.00	0.00
June	XI	1	16.80	27.91	0.00
June	XI	2	0.00	14.72	0.00
June	XI	3	70.42	30.87	0.00
June	XII	1	63.14	70.00	0.00
June	XIII	1	40.66	9.73	0.00
June	XIII	2	0.00	5.33	0.00
June	XIII	3	35.25	17.63	0.00
June	XIII	4	356.95	142.70	0.00
June	XIV	1	303.29	52.17	0.00
June	XIV	2	277.73	16.51	0.00
June	XIV	3	268.50	6.42	0.00
June	XIV	4	142.07	47.36	0.00
June	XIV	5	409.61	85.43	0.00
June	XV	1	2039.26	55.76	0.00
June	XV	2	406.47	19.25	0.00
June	XV	3	151.38	14.65	0.00
June	XV	4	0.00	0.00	0.00
June	XV	5	188.80	0.00	0.00
July	I	1	35.60	5.72	0.00
July	I	2	75.92	7.03	0.00
July	I	3	0.00	23.17	0.00
July	II	1	218.78	175.16	0.00
July	III	1	128.04	5.69	0.00
July	III	2	101.22	23.80	0.00
July	III	3	57.06	22.31	0.00

TAXON=ALL YEAR=1983

MONTH	TRANSECT	STATION	YS	NYS	J
July	IV	1	15.62	15.80	0.00
July	V	1	77.11	46.27	0.00
July	VI	1	35.85	31.50	0.00
July	VI	2	208.41	30.77	0.00
July	VI	3	137.20	5.46	0.00
July	VI	4	76.01	6.92	0.00
July	VI	5	335.60	78.28	0.00
July	VII	1	56.35	33.18	0.00
July	VII	2	133.80	11.16	0.00
July	VII	3	381.52	16.52	0.00
July	VII	4	153.25	35.44	0.00
July	VII	5	61.80	0.00	0.00
July	VIII	1	153.55	20.31	0.00
July	VIII	2	89.94	24.72	0.00
July	VIII	3	37.88	4.71	0.00
July	VIII	4	97.77	23.49	0.00
July	VIII	5	866.90	0.00	0.00
July	IX	1	584.45	0.00	0.00
July	IX	2	371.27	27.48	0.00
July	IX	3	178.81	4.90	0.00
July	IX	4	137.62	4.68	0.00
July	IX	5	176.77	0.00	0.00
July	X	1	66.45	598.28	0.00
July	X	2	33.53	174.80	0.00
July	X	3	0.00	259.16	0.00
July	X	4	0.00	344.65	0.00
July	XI	1	581.68	1710.61	0.00
July	XI	2	11.81	172.02	0.00
July	XI	3	5.84	129.31	0.00
July	XII	1	26.22	1367.59	0.00
July	XIII	1	33.59	230.03	0.00
July	XIII	2	55.11	372.44	0.00
July	XIII	3	15.03	128.29	0.00
July	XIII	4	0.00	147.79	0.00
July	XIV	1	146.60	666.69	0.00
July	XIV	2	312.41	505.83	0.00
July	XIV	3	66.84	346.59	0.00
July	XIV	4	95.91	209.54	0.00
July	XIV	5	18.17	790.47	0.00
July	XV	1	317.14	969.31	0.00
July	XV	2	374.73	326.00	0.00
July	XV	3	262.88	647.01	0.00
July	XV	4	371.32	165.55	0.00
July	XV	5	66.25	802.69	0.00
Aug	I	1	16.13	172.48	0.00
Aug	I	2	42.40	114.85	0.00
Aug	I	3	91.48	107.95	0.00
Aug	II	1	0.00	69.12	0.00
Aug	III	1	11.22	107.44	0.00
Aug	III	2	29.01	162.71	0.00
Aug	III	3	89.29	127.77	0.00
Aug	IV	1	0.00	18.67	0.00
Aug	V	1	0.00	117.19	14.87

TAXON=ALL YEAR=1983

MONTH	TRANSECT	STATION	YS	NYS	J
Aug	VI	1	0.00	42.09	0.00
Aug	VI	2	15.98	123.66	0.00
Aug	VI	3	22.77	112.97	0.00
Aug	VI	4	27.23	200.86	0.00
Aug	VI	5	59.71	110.18	0.00
Aug	VII	1	0.00	181.25	0.00
Aug	VII	2	16.71	133.31	0.00
Aug	VII	3	18.00	65.39	0.00
Aug	VII	4	16.74	117.29	0.00
Aug	VII	5	0.00	170.92	0.00
Aug	VIII	1	0.00	721.09	0.00
Aug	VIII	2	4.46	484.21	0.00
Aug	VIII	3	0.00	375.12	0.00
Aug	VIII	4	0.00	28.70	0.00
Aug	VIII	5	19.00	41.25	0.00
Aug	IX	1	0.00	33.68	0.00
Aug	IX	2	5.32	26.37	0.00
Aug	IX	3	20.33	72.62	0.00
Aug	IX	4	4.90	375.51	0.00
Aug	IX	5	0.00	33.40	0.00
Aug	X	1	0.00	26.56	0.00
Aug	X	2	0.00	34.67	0.00
Aug	X	3	0.00	14.34	0.00
Aug	X	4	0.00	0.00	0.00
Aug	XI	1	0.00	43.81	44.16
Aug	XI	2	0.00	11.50	0.00
Aug	XI	3	0.00	12.80	0.00
Aug	XII	1	0.00	0.00	0.00
Aug	XIII	1	0.00	4.76	0.00
Aug	XIII	2	0.00	10.61	0.00
Aug	XIII	3	0.00	0.00	0.00
Aug	XIII	4	5.82	0.00	0.00
Aug	XIV	1	33.88	33.88	0.00
Aug	XIV	2	18.10	34.85	0.00
Aug	XIV	3	27.70	27.40	0.00
Aug	XIV	4	0.00	6.96	0.00
Aug	XIV	5	0.00	47.41	0.00
Aug	XV	1	0.00	0.00	0.00
Aug	XV	2	0.00	11.01	0.00
Aug	XV	3	0.00	60.96	0.00
Aug	XV	4	11.17	22.80	0.00
Aug	XV	5	0.00	130.46	0.00

TAXON=ALL YEAR=1984

MONTH	TRANSECT	STATION	YS	NYS	J
May	I	1	11.95	0.00	0.00
May	I	2	0.00	0.00	0.00
May	I	3	0.00	0.00	0.00
May	II	1	0.00	0.00	0.00
May	III	1	5.75	0.00	0.00
May	III	2	9.69	4.85	0.00
May	III	3	0.00	0.00	0.00
May	IV	1	67.54	0.00	0.00
May	V	1	148.52	0.00	0.00
May	VI	1	18.67	0.00	0.00
May	VI	2	13.58	0.00	0.00
May	VI	3	19.09	0.00	0.00
May	VI	4	0.00	0.00	0.00
May	VI	5	0.00	0.00	0.00
May	VII	1	0.00	0.00	0.00
May	VII	2	0.00	0.00	0.00
May	VII	3	12.28	0.00	0.00
May	VII	4	0.00	0.00	0.00
May	VII	5	0.00	0.00	0.00
May	VIII	1	23.37	11.68	0.00
May	VIII	2	24.75	0.00	0.00
May	VIII	3	8.47	14.36	0.00
May	VIII	4	0.00	8.56	0.00
May	VIII	5	0.00	0.00	0.00
May	IX	1	17.94	0.00	0.00
May	IX	2	0.00	0.00	0.00
May	IX	3	5.29	10.57	0.00
May	IX	4	15.81	0.00	0.00
May	IX	5	40.52	0.00	0.00
May	X	1	36.35	0.00	0.00
May	X	2	13.93	0.00	0.00
May	X	3	20.77	0.00	0.00
May	X	4	61.55	0.00	0.00
May	XI	1	49.53	0.00	0.00
May	XI	2	25.98	0.00	0.00
May	XI	3	70.60	11.86	0.00
May	XII	1	7.06	0.00	0.00
May	XIII	1	22.63	5.66	0.00
May	XIII	2	10.59	15.45	0.00
May	XIII	3	42.04	15.69	0.00
May	XIII	4	38.90	27.99	0.00
May	XIV	1	17.77	17.77	0.00
May	XIV	2	7.18	21.54	0.00
May	XIV	3	17.44	47.74	0.00
May	XIV	4	27.27	16.94	0.00
May	XIV	5	53.92	90.64	0.00
May	XV	1	38.52	0.00	0.00
May	XV	2	0.00	0.00	0.00
May	XV	3	0.00	0.00	0.00
May	XV	4	22.99	0.00	0.00
May	XV	5	123.39	88.06	0.00
June	I	1	61.96	36.13	0.00
June	I	2	84.14	21.03	0.00
June	I	3	17.77	26.97	0.00

TAXON=ALL YEAR=1984

MONTH	TRANSECT	STATION	YS	NYS	J
June	II	1	672.84	2253.41	0.00
June	III	1	36.10	5.97	0.00
June	III	2	249.28	57.56	0.00
June	III	3	175.30	7.14	0.00
June	IV	1	0.00	54.08	0.00
June	V	1	16.59	1639.32	0.00
June	VI	1	152.49	67.52	0.00
June	VI	2	169.11	31.72	0.00
June	VI	3	169.00	0.00	0.00
June	VI	4	270.93	0.00	0.00
June	VI	5	88.66	17.41	0.00
June	VII	1	35.99	18.67	0.00
June	VII	2	519.51	29.86	0.00
June	VII	3	289.07	30.79	0.00
June	VII	4	225.47	37.47	0.00
June	VII	5	0.00	18.57	0.00
June	VIII	1	36.01	12.06	0.00
June	VIII	2	216.31	10.16	0.00
June	VIII	3	191.13	22.41	0.00
June	VIII	4	390.53	47.03	0.00
June	VIII	5	96.65	0.00	0.00
June	IX	1	303.89	15.82	0.00
June	IX	2	169.09	5.48	0.00
June	IX	3	171.65	44.07	0.00
June	IX	4	281.87	46.94	0.00
June	IX	5	64.23	0.00	0.00
June	X	1	132.17	377.81	0.00
June	X	2	49.17	271.54	0.00
June	X	3	12.49	180.78	0.00
June	X	4	247.84	406.57	0.00
June	XI	1	146.91	510.97	0.00
June	XI	2	21.22	200.10	0.00
June	XI	3	276.66	84.52	0.00
June	XII	1	211.08	290.56	0.00
June	XIII	1	33.77	110.66	0.00
June	XIII	2	46.78	546.24	0.00
June	XIII	3	81.97	138.72	0.00
June	XIII	4	340.95	139.48	0.00
June	XIV	1	157.70	196.15	0.00
June	XIV	2	263.24	238.18	0.00
June	XIV	3	178.92	99.44	0.00
June	XIV	4	111.74	196.40	0.00
June	XIV	5	1477.77	778.91	0.00
June	XV	1	362.58	846.38	0.00
June	XV	2	530.26	417.84	0.00
June	XV	3	1751.85	1410.28	0.00
June	XV	4	2795.33	223.25	0.00
June	XV	5	715.36	782.43	0.00
July	I	1	341.63	334.38	0.00
July	I	2	541.55	378.30	0.00
July	I	3	297.06	381.88	0.00
July	II	1	22.77	729.56	0.00
July	III	1	212.02	111.34	0.00

TAXON=ALL YEAR=1984

MONTH	TRANSECT	STATION	YS	NYS	J
July	III	2	506.41	292.20	0.00
July	III	3	847.22	472.78	0.00
July	IV	1	178.29	394.47	0.00
July	V	1	119.49	430.64	18.04
July	VI	1	729.16	390.38	0.00
July	VI	2	367.72	296.23	0.00
July	VI	3	287.52	260.84	0.00
July	VI	4	457.21	721.21	0.00
July	VI	5	2277.24	5439.13	0.00
July	VII	1	100.37	391.85	0.00
July	VII	2	111.52	458.85	0.00
July	VII	3	220.89	301.15	0.00
July	VII	4	177.03	601.01	0.00
July	VII	5	123.84	756.19	0.00
July	VIII	1	73.54	163.01	0.00
July	VIII	2	61.48	413.98	0.00
July	VIII	3	96.67	465.08	0.00
July	VIII	4	166.83	340.21	0.00
July	VIII	5	176.09	825.97	0.00
July	IX	1	0.00	89.79	0.00
July	IX	2	78.44	351.97	0.00
July	IX	3	66.30	378.83	0.00
July	IX	4	56.72	404.46	0.00
July	IX	5	246.25	396.65	0.00
July	X	1	8.54	630.93	0.00
July	X	2	0.00	483.20	0.00
July	X	3	6.06	147.38	57.34
July	X	4	0.00	438.31	15.64
July	XI	1	8.83	584.67	0.00
July	XI	2	6.06	446.73	0.00
July	XI	3	0.00	248.40	0.00
July	XII	1	0.00	1425.50	19.90
July	XIII	1	4.63	208.96	4.66
July	XIII	2	5.34	808.99	0.00
July	XIII	3	5.08	51.76	0.00
July	XIII	4	8.46	292.84	18.54
July	XIV	1	47.62	621.26	15.72
July	XIV	2	46.47	445.44	0.00
July	XIV	3	13.32	58.05	0.00
July	XIV	4	0.00	126.74	0.00
July	XIV	5	0.00	549.76	0.00
July	XV	1	75.45	708.33	0.00
July	XV	2	24.43	451.13	0.00
July	XV	3	104.08	357.99	0.00
July	XV	4	70.38	156.80	0.00
July	XV	5	0.00	1486.16	385.51
Aug	I	1	0.00	28.77	0.00
Aug	I	2	0.00	5.57	0.00
Aug	I	3	0.00	104.21	0.00
Aug	II	1	0.00	179.41	8.43
Aug	III	1	0.00	13.05	0.00
Aug	III	2	5.62	22.69	0.00
Aug	III	3	0.00	7.66	0.00

TAXON=ALL YEAR=1984

MONTH	TRANSECT	STATION	YS	NYS	J
Aug	IV	1	0.00	67.89	0.00
Aug	V	1	0.00	257.19	0.00
Aug	VI	1	0.00	37.30	0.00
Aug	VI	2	0.00	22.60	13.33
Aug	VI	3	0.00	35.36	0.00
Aug	VI	4	7.17	14.43	0.00
Aug	VI	5	0.00	33.23	282.49
Aug	VII	1	0.00	0.00	0.00
Aug	VII	2	0.00	5.54	0.00
Aug	VII	3	20.05	19.33	0.00
Aug	VII	4	0.00	11.50	0.00
Aug	VII	5	0.00	17.03	0.00
Aug	VIII	1	0.00	15.99	0.00
Aug	VIII	2	0.00	0.00	0.00
Aug	VIII	3	0.00	8.55	0.00
Aug	VIII	4	0.00	0.00	0.00
Aug	VIII	5	0.00	49.48	0.00
Aug	IX	1	0.00	0.00	0.00
Aug	IX	2	0.00	6.26	0.00
Aug	IX	3	4.44	17.77	0.00
Aug	IX	4	5.33	0.00	0.00
Aug	IX	5	0.00	0.00	0.00
Aug	X	1	0.00	0.00	0.00
Aug	X	2	0.00	33.88	0.00
Aug	X	3	0.00	0.00	0.00
Aug	X	4	0.00	0.00	0.00
Aug	XI	1	0.00	0.00	0.00
Aug	XI	2	11.73	0.00	0.00
Aug	XI	3	0.00	0.00	0.00
Aug	XII	1	5.61	0.00	0.00
Aug	XIII	1	0.00	0.00	0.00
Aug	XIII	2	0.00	0.00	0.00
Aug	XIII	3	5.02	5.34	0.00
Aug	XIII	4	0.00	18.25	0.00
Aug	XIV	1	16.67	16.67	0.00
Aug	XIV	2	0.00	0.00	0.00
Aug	XIV	3	6.21	0.00	0.00
Aug	XIV	4	0.00	0.00	0.00
Aug	XIV	5	0.00	0.00	0.00
Aug	XV	1	0.00	0.00	0.00
Aug	XV	2	0.00	12.00	0.00
Aug	XV	3	0.00	0.00	0.00
Aug	XV	4	45.10	0.00	0.00
Aug	XV	5	0.00	33.96	0.00
Sept	I	1	0.00	0.00	0.00
Sept	I	2	0.00	0.00	0.00
Sept	I	3	0.00	0.00	0.00
Sept	II	1	0.00	0.00	0.00
Sept	III	1	0.00	0.00	0.00
Sept	III	2	0.00	0.00	0.00
Sept	III	3	0.00	0.00	0.00
Sept	IV	1	0.00	0.00	0.00
Sept	V	1	0.00	0.00	0.00

---------- TAXON=ALL YEAR=1984 ----------

MONTH	TRANSECT	STATION	YS	NYS	J
Sept	VI	1	0.00	0.00	0.00
Sept	VI	2	0.00	0.00	0.00
Sept	VI	3	0.00	0.00	0.00
Sept	VI	4	0.00	0.00	0.00
Sept	VI	5	0.00	0.00	0.00
Sept	VII	1	0.00	0.00	0.00
Sept	VII	2	0.00	0.00	0.00
Sept	VII	3	0.00	0.00	0.00
Sept	VII	4	0.00	0.00	0.00
Sept	VII	5	0.00	0.00	0.00
Sept	VIII	1	0.00	0.00	0.00
Sept	VIII	2	0.00	0.00	0.00
Sept	VIII	3	0.00	0.00	0.00
Sept	VIII	4	0.00	0.00	0.00
Sept	VIII	5	0.00	0.00	0.00
Sept	IX	1	0.00	0.00	0.00
Sept	IX	2	0.00	0.00	0.00
Sept	IX	3	0.00	0.00	0.00
Sept	IX	4	0.00	0.00	0.00
Sept	IX	5	0.00	0.00	0.00
Sept	X	1	0.00	0.00	0.00
Sept	X	2	0.00	0.00	0.00
Sept	X	3	0.00	0.00	0.00
Sept	X	4	0.00	0.00	0.00
Sept	XI	1	0.00	0.00	0.00
Sept	XI	2	0.00	0.00	0.00
Sept	XI	3	0.00	0.00	0.00
Sept	XII	1	0.00	0.00	0.00
Sept	XIII	1	0.00	0.00	0.00
Sept	XIII	2	0.00	0.00	0.00
Sept	XIII	3	0.00	0.00	0.00
Sept	XIII	4	0.00	0.00	0.00
Sept	XIV	1	0.00	0.00	0.00
Sept	XIV	2	0.00	0.00	0.00
Sept	XIV	3	0.00	0.00	0.00
Sept	XIV	4	0.00	0.00	0.00
Sept	XIV	5	0.00	0.00	0.00
Sept	XV	1	0.00	0.00	0.00
Sept	XV	2	0.00	0.00	0.00
Sept	XV	3	0.00	0.00	0.00
Sept	XV	4	0.00	0.00	0.00
Sept	XV	5	0.00	0.00	0.00

APPENDIX 8. Analysis of variance and Tukey's studentized range test results comparing densities of *fish larvae (all species combined)* across transects, locations, and months.

St. Clair River All Species Analysis of Variance for Upper River

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	PROBABILITY OF NONSIGNIFICANT F
Month	3	335.80	< .001
Location	2	16.82	.008
Year	1	7.88	.030
Transect	2	6.41	.144
Month*Year	3	151.23	< .001
Month*Location	6	27.18	.016
Month*Transect	6	18.67	.087
Location*Year	2	4.60	.247
Transect*Location	4	13.69	.087
Transect*Year	2	5.87	.169
Month*Loc*Year	6	7.24	.612
Month*Tran*Loc	12	36.11	.053
Month*Tran*Year	6	6.63	.661
Tran*Loc*Year	4	7.22	.354
Month*Tran*Loc*Year	12	26.42	.202
Error	72	115.97	

St. Clair River All Species Analysis of Variance for Lower River

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	PROBABILITY OF NONSIGNIFICANT F
Month	3	224.79	< .001
Location	2	62.23	< .001
Year	1	10.84	.023
Transect	2	12.73	.047
Month*Year	3	199.01	< .001
Month*Location	6	42.53	.004
Month*Transect	6	17.02	.218
Location*Year	2	.78	.823
Transect*Location	4	13.39	.165
Transect*Year	2	2.95	.481
Month*Loc*Year	6	17.56	.202
Month*Tran*Loc	12	28.78	.299
Month*Tran*Year	6	14.59	.307
Tran*Loc*Year	4	10.17	.288
Month*Tran*Loc*Year	12	43.78	.059
Error	72	143.70	

Tukey's Test on main effect means; alpha=.05

Transect:	7	9	8
mean:	3.23	3.43	3.94

Detroit River All Species Analysis of Variance for 1983

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	PROBABILITY OF NONSIGNIFICANT F
Month	3	272.09	< .001
Location	2	23.11	.003
Transect	3	37.59	< .001
Month*Location	6	9.44	.497
Month*Transect	9	14.53	.507
Location*Transect	6	18.84	.117
Month*Tran*Loc	18	51.66	.083
Error	48	83.18	

Tukey's Test on main effect means; alpha=.05

Transect:	13	10	11	14
mean:	2.58	2.79	3.33	4.20

Month:	May	August	June	July
mean:	1.46	2.01	3.64	5.79

Location:	E	M	E1
mean:	2.65	3.18	3.85

Detroit River All Species Analysis of Variance for 1984

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	PROBABILITY OF NONSIGNIFICANT F
Month	3	383.56	< .001
Location	2	.02	.985
Transect	3	3.17	.117
Month*Location	6	10.45	.007
Month*Transect	9	4.05	.549
Location*Transect	6	7.25	.044
Month*Tran*Loc	18	49.80	< .001
Error	48	24.52	

APPENDIX 9. Analysis of variance and Tukey's studentized range test results comparing alewife larvae densities across transects, locations, and months.

St. Clair River Alewife Analysis of Variance Excluding Transect I

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	PROBABILITY OF NONSIGNIFICANT F
Month	1	299.67	< .001
Location	2	12.01	.031
Year	1	11.86	.009
Transect	4	13.85	.090
Month*Year	1	111.81	< .001
Month*Location	2	23.85	.002
Month*Transect	4	23.02	.012
Location*Year	2	1.52	.632
Transect*Location	8	25.38	.071
Transect*Year	4	11.21	.159
Month*Loc*Year	2	6.10	.164
Month*Tran*Loc	8	22.29	.117
Month*Tran*Year	4	7.27	.360
Tran*Loc*Year	8	21.37	.135
Month*Tran*Loc*Year	8	25.72	.069
Error	60	98.26	

St. Clair River Alewife Analysis of Variance Transect I Only

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	PROBABILITY OF NONSIGNIFICANT F
Month	1	3.92	.125
Location	2	1.25	.658
Year	1	.13	.768
Month*Year	1	49.97	< .001
Month*Location	2	13.50	.032
Location*Year	2	7.78	.108
Month*Loc*Year	2	.90	.739
Error	12	17.32	

Detroit River Alewife Analysis of Variance

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	PROBABILITY OF NONSIGNIFICANT F
Month	2	361.56	< .001
Location	2	13.88	.014
Year	1	8.91	.018
Transect	3	9.31	.117
Month*Year	2	125.31	< .001
Month*Location	4	9.67	.188
Month*Transect	6	10.70	.332
Location*Year	2	.27	.914
Transect*Location	6	14.28	.171
Transect*Year	3	6.84	.223
Month*Loc*Year	4	5.43	.475
Month*Tran*Loc	12	18.72	.438
Month*Tran*Year	6	6.89	.610
Tran*Loc*Year	6	18.33	.076
Month*Tran*Loc*Year	12	34.04	.054
Error	72	109.85	

Tukey's Test on main effect means; alpha=.05

Location:	E	M	E1
mean:	2.03	2.47	2.79
